

# HIV-related sexual risk taking among HIV-negative men who have sex with men in Zagreb, Croatia

---

Štulhofer, Aleksandar; Baćak, Valerio; Božičević, Ivana; Begovac, Josip

Source / Izvornik: **AIDS and Behavior**, 2008, 12, 505 - 512

Journal article, Accepted version

Rad u časopisu, Završna verzija rukopisa prihvaćena za objavljivanje (postprint)

<https://doi.org/10.1007/s10461-007-9327-3>

Permanent link / Trajna poveznica: <https://um.nsk.hr/um:nbn:hr:105:609119>

Rights / Prava: [In copyright](#) / [Zaštićeno autorskim pravom](#).

Download date / Datum preuzimanja: **2024-12-03**



Repository / Repozitorij:

[Dr Med - University of Zagreb School of Medicine  
Digital Repository](#)





### **Središnja medicinska knjižnica**

Štulhofer, A., Baćak, V., Božičević, I., Begovac, J. (2007) *HIV-related Sexual Risk Taking Among HIV-negative Men Who Have Sex with Men in Zagreb, Croatia*. *AIDS and Behavior*, [Epub ahead of print].

The original publication is available at [www.springerlink.com](http://www.springerlink.com)

<http://www.springerlink.com/content/qg4rvw206h430134/>

<http://dx.doi.org/10.1007/s10461-007-9327-3>

<http://medlib.mef.hr/310>

University of Zagreb Medical School Repository

<http://medlib.mef.hr/>

# **HIV-Related Sexual Risk Taking Among HIV-Negative Men Who Have Sex with Men in Zagreb, Croatia**

Aleksandar Štulhofer <sup>a</sup>

Valerio Baćak <sup>a</sup>

Ivana Božičević <sup>b</sup>

Josip Begovac <sup>c</sup>

<sup>a</sup>Faculty of Humanities and Social Sciences, University of Zagreb

<sup>b</sup>Andrija Stampar School of Public Health, Medical School, University of Zagreb

<sup>c</sup>University Hospital for Infectious Diseases, Zagreb

## **Abstract**

Croatia has a low-level HIV epidemic and, as in a number of other Central and Southeastern European countries, sex between men accounts for most HIV infections. This study examines sexual behavior and the correlates of condom use in a snowball sample of 342 HIV noninfected men who have sex with men (MSM) in Zagreb. The median age of participants in the sample was 27 years. The majority of participants (81%) reported using condom at last anal sex with casual partner and 56% claimed to have used condoms consistently at anal sex with casual partners in the last 12 months. HIV risk self-assessment and number of sexual partners were significantly correlated with condom use at last anal sex with casual partner. Selfassessed HIV-risk and heterosexual activity were found associated with consistent condom use at anal sex with casual partners. To sustain a low-level HIV epidemic, targeted intervention among young MSM is needed in Croatia.

**Keywords:** HIV, men who have sex with men, sexual risk taking, condom use, Croatia

## INTRODUCTION

The HIV epidemic varies across Europe. In Eastern Europe, HIV infection is still transmitted predominantly among injecting drug users, but there is also evidence of increasing heterosexual transmission (EuroHIV, 2006). In Central and Western Europe, the predominant route of transmission is heterosexual, however, Sub-Saharan African immigrants constitute about half of these newly diagnosed cases in Western Europe (Hamers et al., 2006). This means that men who have sex with men (MSM) remain the group at greatest risk within the European Union (Hamers et al., 2006). In Croatia, MSM account for the majority of HIV cases, as in the neighboring countries such as Hungary and Slovenia (UNAIDS, 2006). Also, a considerable increase in HIV infected MSM has been observed in Serbia (Simić, 2006). Croatia has a low level epidemic (Begovac et al., 2006) and 41.8% of 608 HIV infections registered in the period 1986-2006 were among MSM (Croatian National Institute of Public Health, 2007). Until recently no reliable surveillance data has been available about HIV prevalence and risk related behaviors in this population. In addition to other more common risk factors, specific social conditions and stigmatization of homosexuality in postcommunist, transitional societies contribute to the vulnerability of MSM (Poundstone et al., 2004; Rhodes & Simic, 2005; Štulhofer & Sandfort, 2005). As an example, a recent study conducted among general practice physicians in Croatian capital revealed that 30% would prefer not to work with MSM patients (Cazin et al., 2006).

Here we present the results of the behavioral survey of MSM living in Zagreb, Croatia, focusing on the prevalence of risky behavior and correlates of condom use among HIVnegative participants. The paper supplements the detailed presentation of the data on seroprevalence of HIV and other sexually transmitted infections in this population reported elsewhere (Božičević et al., manuscript submitted for publication).

## **METHODS**

### *Participants*

The original HIV bio-behavioral survey used the recently developed respondent-driven sampling (RDS) methodology, which has been suggested as the preferred approach to hidden and hard to reach populations (Heckathorn, 1997; 2002). Although RDS provided a probabilistic sample of MSM in Zagreb, in the analyses presented here we use a non-weighted dataset (unadjusted for network size and the degree of homophily between recruiters and recruits) because multivariate analysis is currently not supported in the RDSAT statistical software, which is required to calculate (weighted) population proportion estimates. Therefore, the dataset used in this article was a standard snowball sample.

Data were collected from September 8 until December 22, 2006 at the University Hospital for Infectious Diseases “Dr Fran Mihaljevic” in Zagreb. Adult men who reported having sex with at least one man in the last 12 months and who lived, worked or studied in Zagreb were eligible to participate in the study. Participants were asked to complete a self-administered questionnaire and give blood and urine specimen, which qualified them for the primary incentive (\$18). In addition, they would receive secondary incentive (\$9) for each of their peers (maximum of three peers) successfully recruited into the study. Participants were also given HIV-related educational brochures, free condoms, and lubricants. The study was approved by the Ethical Review Board of the University Hospital in Zagreb.

All the enrolled participants agreed to take part in both the behavioral and biological parts of the study. The final sample size of 360 included 18 HIV-positive men who were excluded from the analyses presented in this paper to eliminate the biases associated with knowing their status (the majority knew their status from before enrolling in the survey) and the potential impact that knowledge had on their condom use (Timpson et al., 2001). For

example, HIV negative individuals may be less concerned about the risk of infecting their partners than HIV positive individuals. Furthermore, as the number of HIV-positive individuals in our sample was too small for separate analyses, we decided to focus on HIV-negative men.

The survey was implemented in cooperation with two local NGOs, one working with sexual minorities and the other assisting people living with HIV/AIDS. Activists from the first NGO helped in selecting the initial participants and screened all recruits for eligibility. Informed consent was obtained from all participants. Pre-test HIV counseling was mandatory for every participant who had agreed to give biological specimen. In addition to HIV, blood and urine were screened for syphilis, HAV, HBV, HCV and HSV-2, as well as for (urethral) chlamydia and gonorrhea. Self-collected rectal swabs, which were not required for receiving the primary incentive, were tested for gonorrhea and chlamydia (for details see Božičević et al., manuscript submitted for publication). Participants with positive test results were referred to further counseling, care and treatment.

### *Measures*

Participants completed a self-administered questionnaire containing 81 questions about sociodemographic characteristics, discrimination and abuse history, knowledge of HIV, substance abuse behavior, sexual risk behaviors, HIV status and testing history, patterns of searching for sexual partners, STI symptoms, HIV risk self-assessment, and exposure to HIV prevention.

Education was a categorical variable spanning from primary school to college. Due to a small number of participants with only primary education ( $n = 10$ ), the variable was dichotomized into 1 = college educated and 0 = high-school or less educated. Sexual

orientation was assessed by asking participants whether they self-identify as homosexual, bisexual, heterosexual or other. Knowledge about HIV/AIDS was measured by seven questions about HIV transmission (e.g. “Can one get infected by sharing meals with an HIVpositive person?) and modes of protection from the infection (“Is it possible to protect oneself from HIV infection by having sex with only one, healthy, and faithful person?”). Response options were “yes”, “no”, and “I don’t know”. Correct answers were coded as 1 and incorrect as 0; the HIV knowledge scale was computed by adding correct answers.

Participants were asked whether they are currently in a stable relationship. In addition to questions about the number of sexual partners (defined as partners in anal sex) in the last five years and in the last 12 months, participants were asked how often they cruised gay venues (bars, clubs, saunas) and surfed the Internet for sexual partners in the last 12 months. Both indicators included a 7-item response scale (ranging from “never” to “every day”). The first indicator was recoded into four categories: never, rarely (up to once a month), sometimes (up to once a week), and often (several times a week or everyday). Due to extremely skewed distribution, online search for partners was dichotomized (no/yes). Participants were also asked whether they ever sold sex to a male customer (yes/no).

Alcohol and drug use preceding sex were assessed by single-item indicators (“In the last 12 months, have you used alcohol before having sex?”). Responses were recorded on 4-point scales ranging from “never” to “often”. Due to low number of responses in some categories, both variables were dichotomized into 0 = never and 1 = rarely to often. Selfassessment of HIV risk exposure was also measured by a one-item indicator (“How would you rate the risk of HIV infection you are personally exposed to?”). Answers were recorded on a 5-point scale ranging from 1 = “no risk” to 5 = “very high risk”). Heterosexual activities were assessed by asking participants if they ever had sex with a woman and if they

used condom the last time they had sex with a woman.

Sexual risk taking was defined by two variables: (1) condom used at last anal sex with a casual partner (0 = no, 1 = yes) and (2) condoms consistently used at anal sex with casual partners in the past 12 months (0 = no, 1 = yes).

### *Data Analyses*

Age groups differences in sociodemographic characteristics and patterns of sexual behavior were tested using chi-square test for categorical variables and one-way ANOVA for continuous variables. *T*-test was used for testing differences between self-identified homosexual and bisexual participants, as well as between consistent and inconsistent condom users. Finally, multiple logistic regression was applied in order to analyze the correlates of condom use. To check linearity between the independent variables and the log odds of the dependent, logit step tests were performed for all interval and continuous independent variables. If the assumption of linearity was found violated, the independent variable was categorized to obtain separate logits for different levels of the variable. The goodness-of-fit of our logistic regression models was evaluated by the Hosmer-Lameshov test.

## **RESULTS**

Table 1 presents socio-demographic and socio-sexual characteristics of the sample. Most participants were between 18 and 33 years of age (the median age was 27 years). One third of participants reported having college-level education, which is about four times higher a proportion than in the national population. Slightly less than half of the sample reported being in stable relationship at the time of the survey. Although the majority of participants selfidentified as homosexuals, one fourth described their sexual orientation as bisexual. No



significant difference in age was found among these two groups ( $t = -.92, p > .35$ ). Only four participants (1.2%) reported other sexual orientation.

On average, participants experienced their first same-sex contact, defined as oral or anal intercourse, at the age of 19. Median number of partners in the last five years, with whom anal sex was practiced, was five. No significant difference was found in the number of partners in the last five years among men who had sex exclusively with men and those who did not ( $t = -1.82, p > .07$ ). In the preceding year, the median number of sexual partners was one. Most participants reported being both active (insertive) and passive (receptive) sexual partners.

Approximately a third of participants reported illicit drug use before having sex, the majority of whom used marijuana (17.3%), amyl nitrate (7.6%) and amphetamine (4.5%). Only 13 (3.8%) participants used drugs intravenously. Alcohol use was more frequent than drug use. A minority of men (5%) reported selling sex. Over a quarter of participants (29%) claimed to have never had anal sex with a casual partner. In regard to condom use, 81% of participants used it the last time they had anal sex with casual partner. Substantially less condom use was reported at last sex with a female partner (56%).

### *Age Group Differences*

After participants were divided into three age groups (18-25, 26-33, and 34 and older), a number of significant between-group differences emerged (Table 1). As expected, older respondents were better educated ( $\chi^2 = 70.08, p < .001$ ) and had a higher number of sexual partners in the past five years ( $F = 10.26, p < .001$ ). Also, they were more likely to have had heterosexual experiences ( $\chi^2 = 13.52, p < .01$ ). In comparison to those older than 25 years, the participants in the youngest age group (18-25) were found less likely to have tested for HIV

( $\chi^2 = 26.42, p < .001$ ).

TABLE 1 – Sociodemographic and Socio-Sexual Characteristics of the Sample by Age Group

		18-25 (n = 148)	26-33 (n = 140)	≥ 34 (n = 54)	All (n = 342)
		<i>n (%)<sup>a</sup></i>			
<i>Education**</i>					
	High-school or less	128 (86.5)	58 (41.4)	23 (42.6)	209 (61.1)
	College	20 (13.5)	82 (58.6)	31 (57.4)	133 (38.9)
<i>In stable relationship</i>					
	No	73 (49.3)	70 (50.0)	30 (55.6)	173 (50.6)
	Yes	74 (50.0)	69 (49.3)	24 (44.4)	167 (48.5)
<i>Sexual orientation (self-identified)</i>					
	Homosexual	105 (70.9)	113 (80.7)	35 (64.8)	253 (74.0)
	Bisexual	40 (27.0)	26 (18.6)	19 (35.2)	85 (24.9)
<i>Age at first oral or anal sex with a man</i>					
	< 17	38 (25.7)	25 (17.9)	14 (25.9)	77 (22.5)
	≥ 17	110 (74.3)	115 (82.1)	37 (68.5)	262 (76.6)
<i>No of (anal sex) partners in the last 5 years**</i>					
	0	7 (4.8)	3 (2.1)	2 (3.7)	12 (3.5)
	1	17 (11.5)	7 (5.0)	6 (11.1)	30 (8.8)
	2-3	42 (28.4)	27 (19.3)	9 (16.7)	78 (22.8)
	4-7	50 (33.8)	36 (25.7)	8 (14.8)	94 (27.5)
	≥ 8	32 (21.6)	61 (43.6)	26 (48.1)	119 (34.8)
<i>No of (anal sex) partners in the last 12 months<sup>b</sup></i>					
	01	38 (25.7)	35 (25.0)	7 (13.0)	80 (23.4)
	2-3	32 (21.6)	29 (20.7)	9 (16.7)	70 (20.5)
	4-7	19 (12.8)	27 (19.3)	14 (25.9)	60 (17.5)
	≥ 8	4 (2.7)	10 (7.1)	3 (5.6)	17 (5.0)
	Missing	5 (3.4)	8 (5.7)	6 (11.1)	19 (5.6)
		50 (33.8)	31 (22.1)	15 (27.8)	96 (28.1)
<i>Cruising places where gay men meet (last 12 months)</i>					
	Never	30 (20.3)	33 (23.6)	9 (16.7)	72 (21.1)
	Rarely	72 (48.6)	69 (49.3)	27 (50.0)	168 (49.1)
	Sometimes	35 (23.6)	33 (23.6)	15 (27.8)	83 (24.3)
	Often	11 (7.4)	4 (2.9)	3 (5.6)	18 (5.3)
<i>Finding partners over the internet (last 12 months)</i>					
	No	74 (50.0)	55 (39.3)	27 (50.0)	156 (45.6)
	Yes	74 (50.0)	85 (53.8)	27 (50.0)	186 (54.4)

<i>Used drugs before sex (last 12 months)</i>					
	No	98 (66.2)	94 (67.1)	33 (61.1)	225 (65.8)
	Yes	47 (31.8)	45 (32.1)	20 (37.0)	112 (32.7)
<i>Used alcohol before sex (last 12 months)</i>					
	No	78 (52.7)	64 (45.7)	22 (40.7)	164 (48.0)
	Yes	69 (46.3)	76 (54.3)	31 (57.4)	176 (51.3)
<i>Ever sold sex</i>					
	No	144 (97.3)	134 (95.7)	47 (87.0)	325 (95.0)
	Yes	4 (2.7)	6 (4.3)	7 (13.0)	17 (5.0)
<i>Condom used at last anal sex with casual partner</i>					
	No	24 (16.2)	15 (10.7)	6 (11.1)	45 (13.2)
	Yes	70 (47.3)	90 (64.3)	37 (68.5)	197 (57.6)
	No such experience	53 (35.8)	34 (24.3)	11 (20.4)	98 (28.7)
<i>Frequency of condom use at anal sex with casual partner (last 12 months)</i>					
	Every time	47 (31.8)	65 (46.4)	24 (44.4)	136 (39.8)
	Often	20 (13.5)	25 (17.9)	12 (22.2)	57 (16.7)
	Sometimes	13 (8.8)	7 (5.0)	3 (5.6)	23 (6.7)
	Rarely	2 (1.4)	4 (2.9)	2 (3.7)	8 (2.3)
	Never	9 (6.1)	7 (5.0)	1 (1.9)	17 (5.0)
	No such experience	55 (37.2)	31 (22.1)	12 (22.2)	98 (28.7)
<i>Condom used at last anal sex with steady partner</i>					
	No	74 (50.0)	76 (54.3)	25 (46.3)	175 (51.2)
	Yes	65 (43.9)	60 (42.9)	27 (50.0)	152 (44.4)
<i>Sex with a woman (ever)*</i>					
	No	81 (54.7)	65 (46.4)	14 (25.9)	160 (46.8)
	Yes	65 (43.9)	74 (52.9)	40 (74.1)	179 (52.3)
<i>Condom used at last vaginal sex <sup>b</sup></i>					
	No	17 (11.5)	34 (24.3)	20 (37.0)	71 (20.8)
	Yes	42 (28.4)	30 (21.4)	19 (35.2)	91 (26.6)
	Never had vaginal sex / Missing	89 (60.1)	76 (54.3)	15 (27.8)	180 (52.6)
<i>HIV risk self-assessment</i>					
	No risk	11 (7.4)	7 (5.0)	3 (5.6)	21 (6.1)
	Low risk	87 (58.8)	70 (50.0)	25 (46.3)	182 (53.2)
	Medium risk	40 (27.0)	45 (32.1)	19 (35.2)	104 (30.4)
	High risk	10 (6.8)	16 (11.5)	6 (11.1)	32 (9.4)
<i>Tested for HIV**</i>					
	No	86 (58.1)	42 (30.0)	17 (31.5)	145 (42.4)
	Yes	61 (41.2)	98 (70.0)	37 (68.5)	196 (57.3)

<sup>a</sup> Percentages do not always add up to 100 due to rounding up and/or missing cases

<sup>b</sup> Missing cases are reported for variables with 10 or more percent of non-reported values

Between-group differences significant at: \*  $p < .01$ , \*\*  $p < .001$

*Correlates of condom use*

Table 2 presents the results of multiple logistic regression with condom use at last anal intercourse with casual partner as the dependent variable. The model included age, education, relationship status, HIV knowledge, HIV risk self-assessment, having tested for HIV, patterns of searching for sexual partners, the number of partners in the last five years, sex with women, commercial sex, as well as drug and alcohol use related to sex. The analysis showed a significant association of self-assessed HIV-risk (OR = .40,  $p < .01$ ) with condom use at last anal sex. Lower odds of condom use at last casual anal sex were associated with higher selfassessment of personal HIV-risk. We also found a non-linear relationship between the number of sexual partners in the last five years and condom use. In comparison to participants who reported 8 or more partners, those with 4-7 partners were significantly less likely to have used condom at last anal sex with casual partner (OR = .22,  $p < .01$ ).

TABLE 2 – Correlates of Condom Use at Last Anal Intercourse with Casual Partner and Consistent Condom Use at Anal Intercourse with Casual Partners in the Last 12 Months

	<i>Condom used at last anal sex</i> ( <i>n</i> = 216) <sup>a</sup>		<i>Consistent condom use</i> ( <i>n</i> = 209) <sup>a</sup>		
	Odds ratio	95% CI	Odds ratio	95% CI	
<i>Age</i>					
	18-25	1	1		
	26-33	1.77	.64 – 4.88	1.70	.79 – 3.65
	≥ 34	1.70	.46 – 6.04	1.09	.41 – 2.88
<i>College education</i> <sup>b</sup>		1.25	.46 – 3.36	.99	.50 – 1.95
<i>Knowledge about HIV</i>		.80	.52 – 1.24	1.13	.83 – 1.54
<i>HIV risk self-assessment</i>		.40**	.22 – .72	.48**	.31 – .76
<i>No of partners in the last 5 years</i>					
	1	.17	.02 – 1.45	4.70	.41 – 53.41
	2-3	.44	.13 – 1.47	1.46	.61 – 3.47
	4-7	.22**	.08 – .59	.67	.32 – 1.42
	≥ 8	1		1	
<i>Sex with a woman</i> <sup>b</sup>		1.54	.68 – 3.49	1.88*	1.01 – 3.51
<i>Sold seks</i> <sup>b</sup>		.41	.07 – 2.45	.68	.15 – 3.12
<i>In stable relationship</i> <sup>b</sup>		1.23	.56 – 2.71	.76	.41 – 1.41
<i>Tested for HIV</i> <sup>b</sup>		1.67	.70 – 3.99	1.52	.77 – 3.00

<i>Used drugs before sex</i> <sup>b</sup>		1.10	.47 – 2.60	.82	.42 – 1.61
<i>Used alcohol before sex</i> <sup>b</sup>		.70	.30 – 1.65	1.01	.52 – 1.95
<i>Frequency of cruising</i>					
	Never	1		1	
	Rarely	1.06	.35 – 3.19	1.13	.47 – 2.70
	Sometimes	.66	.21 – 2.08	1.14	.45 – 2.89
	Often	4.52	.40 - 50.71	1.15	.27 – 4.85
<i>Searching for partners on the Web</i> <sup>b</sup>		.91	.42 – 1.95	.91	.49 – 1.67

<sup>a</sup>Reduced *n* is due to participants reporting no anal sex experience (see Table 1) and missing data

<sup>b</sup>1 = yes

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

The same regression model was used to analyze the correlates of consistent condom use at anal sex with casual partners in the last 12 months. As shown in Table 2, consistent condom use was also associated with HIV-risk self-assessment (OR = .48,  $p < .01$ ). In addition, having ever had a female sexual partner almost doubled the odds of consistent condom use (OR = 1.88,  $p < .05$ ).

## DISCUSSION

We found a high percentage (81%) of MSM reporting using condom at last casual anal sex, and 56% reported consistent condom use with a casual partner in the last 12 months.

Available studies point to substantial levels of sexual risk taking among urban MSM in the region. A recent study conducted among MSM in Tirana showed that only about one quarter (27%) of MSM used condoms consistently and 58.5% of participants reported condom use at last sex with a non-commercial partner (Family Health International, 2006). A study that recruited MSM at gay venues in Budapest in 2001 found that half of participants had unprotected anal intercourse in the last three months (Csepe et al., 2002). In a 1996 study among MSM in Bratislava, less than one third of participants (29%) reported consistent condom use (Stanekova et al., 2000). Also, two studies have demonstrated substantial levels

of risky sexual behavior in St. Petersburg during the 2000-2006 period, where approximately one third of surveyed MSM reported recent unprotected sex (Amirkhanian et al., 2001; Amirkhanian et al., 2006). Amirkhanian et al. (2001) reported similar rates of condom use with a steady partner compared to our findings (49% and 44%, respectively).

Cross-national comparisons also point to similarities in characteristics of the samples used in our study and those carried out in St. Petersburg, Budapest, Bratislava, and Tirana (Family Health International, 2006; Csepe et al., 2002; Stanekova et al., 2000; Amirkhanian et al., 2001; Amirkhanian et al., 2006). All but one of these studies recruited a large number of above-average educated urban MSM (roughly 40% of respondents in St. Petersburg, Budapest, and Zagreb had a college education) whose median age ranged from 25 to 29 years. It was recently shown that convenience sampling tends to recruit younger MSM than probability samplings (Schwarcz et al, 2007).

Keeping in mind differences in a number of indicators used in these studies - different timeframes, anal sex roles (insertive/receptive vs. non-specified), sexual partners (casual/steady vs. non-specified) and commercial sex specification (selling/buying vs. nonspecified) - certain findings suggest culture-specific environments in which MSM live. For example, heterosexual activity of MSM was the highest in the Tirana study (94%) and lowest in the Budapest (26%) and the two St. Petersburg studies (37% and 27%, respectively), with the Zagreb study (52%) somewhere in between. Interestingly, one quarter of participants in the Zagreb and the Budapest samples, and one fifth of the Bratislava sample self-identified as bisexual – pointing to cultural differences in sexual self-defining. Selling sex was reported by 23% of participants in the 2001 St. Petersburg study, 17% in the Budapest study, and only 5% in our study. In the Tirana sample, 41.5% of participants reported commercial sex (selling or buying) in the last six months. These differences could reflect different standards of living in

Russia, Hungary, Croatia and Albania.

Proportion of MSM who had tested for HIV was substantially higher in St. Petersburg (70% in 2001) than in Zagreb (57%), which could be the consequence of more intense intervention efforts in St. Petersburg (Amirkhanian et al., 2006). First steps at targeted HIV intervention among MSM have only recently been attempted in Croatia. Interestingly, when our dataset was weighted for network size and the degree of homophily (Božičević et al., manuscript submitted for publication), syphilis rates in St. Petersburg (Amirkhanian et al., 2006) and Zagreb were almost identical (10% and 10.4%, respectively). The lowest proportion of MSM tested for HIV was found in Tirana (12%).

Two of the studies, the St. Petersburg and the Budapest study, analyzed correlates of condom use at last anal sex (Amirkhanian et al., 2001; Csepe et al., 2002). Of the indicators that were included in our study, the St. Petersburg study found significant effects of steady relationship and HIV knowledge. In addition to the effect of being in a relationship, the Budapest study also pointed to the effects of bisexual orientation and being tested for HIV. Interestingly, while the Budapest study reported that the bisexual orientation decreased the odds of condom being used, our study found the opposite effect of bisexual experience.

The first study on sexual risk taking among MSM was only recently published in Croatia (Radić et al., 2006). It used a rather large convenience sample of 1127 mostly younger men recruited at three different locations (a bar, a sauna, and a disco-club), as well as online using a local gay Internet site. However, there was a low response rate (overall 19%) and the lack of multivariate analyses left many important questions regarding sexual risk taking among Croatian MSM unaddressed. A comparison between this earlier study and ours showed that the median age of participants and median number of sexual partners in the last 12 months were identical. Interestingly, participants in our sample reported higher rates of

consistent condom use (56% vs. 47%) and were more likely to have tested for HIV (57% vs. 54%).

Several findings from our study need to be briefly discussed. The fact that older MSM, in comparison to younger MSM, were more likely to have had heterosexual experience should not be interpreted as the effect of cultural change based on increasing sexual permissiveness. As the lack of age group differences in sexual orientation suggests, it is not clear whether the above finding is the effect of aging or a real age cohort effect. In regard to the observed association between risk assessment and condom use, higher HIV-risk self-assessment was most probably the consequence of not using condoms with casual partners. Finally, the finding that a higher (but not the highest) number of sexual partners decreased the odds of condom use at casual anal sex could indicate a “critical point” at which having multiple sexual partners may not be perceived as sexual risk taking – resulting in failure to use condoms - because the number of sexual partners is not considered “high” by specific subcultural standards.

Our findings have to be weighted against several limitations. The dataset used in the analyses presented was non-probabilistic, which precludes generalization. Secondly, recruited participants were mostly young men, the majority of whom were active on the local gay scene and therefore not representative of the MSM population in general. In addition, selfadministration of the questionnaire, although increasing honesty due to full confidentiality, resulted in a noticeable proportion of missing data on some questions. Finally, apart from HIV risk self-assessment, our study did not measure psychosocial factors.

In conclusion, the findings point to a need for tailored intervention among Croatian MSM. This was already voiced, but without specifying the characteristics of MSM who are more exposed to sexual risks, or details regarding the approach to intervention (Radić et al., 2006). The finding that the majority of young MSM in Zagreb visited gay venues to find



partners suggests that peer-intervention programs could be developed at the existing gay bars, clubs and saunas, especially since peer norms have been found a significant factor in HIV risk reduction (Amirkhanian et al., 2006). In the future, the behavioral HIV surveillance program in Croatia should be appended with a more detailed, qualitative inquiry into the observed nonlinear relationship between multiple sexual partners and condom use.

### **ACKNOWLEDGMENTS**

The study was supported by the Global Fund to Fight AIDS, Tuberculosis and Malaria national grant no: HRV-202-G01-H-00. The authors would like to thank the Center for Sexual and Gender Minorities' Rights *Iskorak*, HIV counselors working for the Croatian Association for HIV (*HUHIV*), laboratory personnel from the AIDS Referral Center at the University Hospital for Infectious Diseases, Zagreb, and Branko Kolarić, MD, PhD.

## REFERENCES

- Amirkhanian, Y.A., Kelly, J.A., Kirsanova, A.V., DiFranceisco, W., Khoursine, R. A., Semenov, A.V., et al. (2006). HIV risk behaviour patterns, predictors, and sexually transmitted disease prevalence in the social networks of young men who have sex with men in St Petersburg, Russia. *International Journal of STD and AIDS*, 17, 50-56.
- Amirkhanian, Y.A., Kelly, J.A., Kukharsky, A.A., Borodkina, O. I., Granskaya, J. V., Dyatlov, R. V., et al. (2001). Predictors of AIDS risk behavior among Russian men who have sex with men: An emerging epidemic. *AIDS*, 15, 407-412.
- Begovac, J., Zekan, S., and Skoko-Poljak, D. (2006). Twenty years of Human Immunodeficiency Virus infection in Croatia: An epidemic that is still in an early stage  
*Collegium Antropologicum*, 30 (Suppl 2), 17-23.
- Božičević, I., Rode, O., Židovec-Lepej, S., Johnston, L.G., Štulhofer, A., Dominković, Z., et al. [manuscript submitted for publication]. Prevalence of sexually transmitted infections and sexual risk behaviours among men who have sex with men in Zagreb, Croatia
- Cazin, I., Pristaš, I., and Kolarić, B. (2006). Knowledge and attitudes of physicians about HIV/AIDS in primary health care practice – a pilot study in the city of Zagreb and the Zagreb county [Znanja i stavovi liječnika o HIV/AIDS-u u primarnoj zdravstvenoj zaštiti – pilot istraživanje u gradu Zagrebu i Zagrebačkoj županiji]. In I. Gjenero-Margan, and B. Kolarić (Eds.), *Second generation of surveillance in HIV infection and AIDS in the Republic of Croatia, 2003-2006*. [Druga generacija praćenja HIV infekcije i AIDS-a u Republici Hrvatskoj 2003-2006] (pp. 34-56). Zagreb: Croatian

- National Institute of Public Health. [In Croatian]
- Croatian National Institute of Public Health (2006). *HIV/AIDS epidemiological situation in Croatia, 2006*. [HIV/AIDS – epidemiološka situacija u Hrvatskoj]. Retrieved June 20, 2007, from <http://www.hzjz.hr/epidemiologija/hiv.htm>. [In Croatian]
- Csepe, P., Amirkhanian, Y.A., Kelly, J.A., McAuliffe, T.L., and Mocsonoki, L. (2002). HIV risk behavior among gay and bisexual men in Budapest, Hungary. *International Journal of STD and AIDS*, 13, 192-200.
- EuroHIV (2006). HIV/AIDS surveillance in Europe, Report No. 73. Retrieved July 16, 2007, from [http://www.eurohiv.org/reports/index\\_reports\\_eng.htm](http://www.eurohiv.org/reports/index_reports_eng.htm).
- Family Health International. (2006). *Albania - Behavioral and Biological Surveillance Study Report*. Retrieved August 13, 2007, from <http://www.fhi.org/NR/rdonlyres/e4dnpa3b7x776x33mmcvu4lnlqfgrfhibxugtbcbzefk w3t2mic6wwise2uzkew2wjv2tn7xevyvie/AlbaniaBSSCompleteHV.pdf>.
- Hamers, F. F., Devaux, I., Alix, J., and Nardone, A. (2006). HIV/AIDS in Europe: Trends and EU-wide priorities. *Eurosurveillance*, 11. Retrieved July 16, 2007, from <http://www.eurosurveillance.org/ew/2006/061123.asp#1>.
- Heckathorn, D. (2002). Respondent-Driven Sampling II: Deriving Valid Population Estimates from Chain-Referral Samples of Hidden Populations. *Social Problems*, 49, 11-34.
- Heckathorn, D. (1997). Respondent-Driven Sampling: A New Approach to the Study of Hidden Populations. *Social Problems*, 44, 174-199.
- Poundstone, K.E., Strathdee, S.A., and Celentano, D.D. (2004). The social epidemiology of human immunodeficiency virus/acquired immunodeficiency syndrome. *Epidemiological Reviews*, 26, 22-35.
- Radić, K., Stanić, D., Bielen, L., and Kolarić, B. (2006). HIV Risks in the Croatian population

of men who have sex with men. [Rizici za HIV u hrvatskoj populaciji muškaraca koji prakticiraju seksualne odnose s muškarcima] In I. Gjenero-Margan, and B. Kolarić (Eds.), *Second generation of surveillance in HIV infection and AIDS in the Republic of Croatia, 2003-2006*. [Druga generacija praćenja HIV infekcije i AIDS-a u Republici Hrvatskoj 2003-2006] (pp. 23-33). Zagreb: Croatian National Institute of Public Health. [In Croatian]

Rhodes, T., and Simic, M. (2005). Transition and the HIV risk environment. *British Medical Journal*, 331, 220-3.

Schwarzc S., Spindler, H., Scheer, S., Valleroy, L., and Lansky, A. (2007). Assessing Representativeness of Sampling Methods for Reaching Men Who Have Sex with Men: A Direct Comparison of Results Obtained from Convenience and Probability Samples. *AIDS and Behavior*, 11, 596–602.

Simić, D. (2006). Epidemiological overview of HIV/AIDS in Serbia in the period 1984-20.11.2006. Institute of Public Health of Serbia “Dr Milan Jovanović Batut” [Epidemiološka situacija HIV/AIDS u Srbiji u periodu 1984-20.11.2006. godine. Institut za javno zdravlje Srbije „Dr Milan Jovanović - Batut”]. Retrieved June 20, 2007, from [http://www.batut.org.yu/activenews\\_view.asp?articleID=93](http://www.batut.org.yu/activenews_view.asp?articleID=93) [In Serbian].

Stanekova, D., Habekova, M., Wimmerova, S., and Gramblickova, I. (2000). HIV infection and sexual behaviour among homosexual and bisexual men in Bratislava. *Central European Journal of Public Health*, 8, 172-175.

Štulhofer, A., and Sandfort, T.G.M. (2005). Introduction: Sexuality and Gender in Times of Transition. In A. Štulhofer and T.G.M. Sandfort (Eds.), *Sexuality and gender in postcommunist Eastern Europe and Russia* (pp. 1-25). New York: The Haworth Press.

Timpson, S. C., Pollak, K. I., Williams, M. L., Ross, M. W., Kapadia, A. S., Bowen, A.

M., McCoy, C. B., McCoy, H. V. (2001) Predictors of stages of change for condom use in crack cocaine users. *AIDS and Behavior*, 5, 65-74.

UNAIDS (2006). *Report on the Global AIDS Epidemic*. Retrieved August 10, 2007, from [http://www.unaids.org/en/HIV\\_data/2006GlobalReport/default.asp](http://www.unaids.org/en/HIV_data/2006GlobalReport/default.asp).