

Depressive Symptoms, Utilization of Mental Health Care, Substance Use and Sexual Risk Among Young Men Who have Sex with Men in EXPLORE: Implications for Age-Specific Interventions

Elizabeth A. Salomon · Matthew J. Mimiaga · Marla J. Husnik · Seth L. Welles · Marc W. Manseau · Arnel B. Montenegro · Steven A. Safren · Beryl A. Koblin · Margaret A. Chesney · Kenneth H. Mayer

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Abstract The EXPLORE study evaluated a behavioral intervention to prevent HIV infection among MSM. We examined depressive symptoms, utilization of mental health care, substance use and HIV risk taking behaviors in YMSM aged 16–25 years compared with their older counterparts. YMSM were more likely to report depressive symptoms (OR = 1.55) and less likely to report use of counseling (OR = 0.39) or medication (OR = 0.20) for psychiatric conditions. YMSM were more likely to report heavy alcohol and drug use. YMSM more often reported engaging in unprotected insertive (OR = 1.60) and receptive (OR = 2.07) anal intercourse with presumed HIV-uninfected partners, and unprotected receptive (OR = 1.72) anal intercourse with partners of unknown-HIV status. These findings suggest the need for more appropriate and accessible mental health care and substance use services for

YMSM. Additionally, HIV prevention work with this population should provide comprehensive education about HIV testing and risk reduction counseling that focuses on communication about serostatus and safety in sexual situations.

Keywords MSM · HIV · Young men · Mental health · Substance use · Sexual behavior

Introduction

Recent studies suggest that the number of new HIV infections is increasing more rapidly in young men who have sex with men (YMSM) than in other age cohorts (Katz et al. 1998; McFarland et al. 2001; Sifakis et al. 2005; Webster et al. 2003). While in the early 1980s the

E. A. Salomon · M. J. Mimiaga · S. A. Safren · K. H. Mayer
The Fenway Institute, Fenway Community Health, Boston,
MA, USA

E. A. Salomon (✉)
Clinical Research Program, Massachusetts General Hospital,
185 Cambridge Street – CPZN 2.128, Boston, MA 02114, USA
e-mail: esalomon@partners.org

M. J. Mimiaga · S. A. Safren
Harvard Medical School/Massachusetts General Hospital,
Boston, MA, USA

M. J. Husnik
Statistical Center for HIV/AIDS Research and Prevention,
Division of Public Health Sciences, Fred Hutchinson Cancer
Research Center, Seattle, WA, USA

S. L. Welles
School of Public Health, Drexel University, Philadelphia,
PA, USA

M. W. Manseau
College of Physicians and Surgeons, Columbia University,
New York, NY, USA

A. B. Montenegro
Rollins School of Public Health, Emory University,
Atlanta, GA, USA

B. A. Koblin
New York Blood Center, New York, NY, USA

M. A. Chesney
Department of Medicine, University of Maryland
School of Medicine, Baltimore, MD, USA

M. A. Chesney
Department of Medicine, University of California
San Francisco, San Francisco, CA, USA

K. H. Mayer
Brown University/Miriam Hospital, Providence, RI, USA

epidemic seemed to typically affect older, more affluent, Caucasian men who had sex with men (MSM), the demographic profile of HIV-infected MSM has gradually shifted towards younger, more marginalized populations (Bingham et al. 2002; Collins 1997). Recent data released by the New York City Department of Health and Mental Hygiene (2007) showed that in New York City the number of new diagnoses of HIV in YMSM under 30 has increased by 33% in the last 6 years and the number of new diagnoses among YMSM aged 13–19 has doubled during this time period.

As suggested by Stall et al. (2003), a combination of health problems and risk factors may make MSM more vulnerable to HIV. The interaction of these factors when layered upon one another (often referred to as a “syndemic” in public health literature) may further amplify MSM’s risk for HIV infection (Koblin et al. 2006; Stall et al. 2003).

Several factors have been posited as being associated with higher infection rates among YMSM: their minimal personal experience with HIV compared with their older counterparts, resulting in less fear of HIV (Chen et al. 2003; Manserg et al. 2002; NAID 1993); their lack of awareness about their HIV infection status, thus putting themselves and others at risk (Bingham et al. 2002; MacKellar et al. 2005) and their propensity towards depression and substance abuse (Seage et al. 1998; Strathdee et al. 1998).

Several early studies examined the prevalence of depression and suicidal ideation in gay, lesbian, bisexual and transgender youth (Garofalo et al. 1999; Gibson 1989; Noell and Ochs 2001; Safren and Heimberg 1999; Remafedi 1999). More recently, studies specific to YMSM have addressed HIV risk (Bingham et al. 2002; Celentano et al. 2006; Dudley et al. 2004; Katz et al. 1998; Lemp et al. 1994; MacKellar et al. 2005; Perdue et al. 2003; Rotheram-Borus et al. 1995; Rusch et al. 2004; Seage et al. 1998; Seal et al. 2000; Strathdee et al. 1998; Stueve et al. 2002; Valleroy et al. 2000; Webster et al. 2003), depression (Botnick et al. 2002; Kipke et al. 2007; Perdue et al. 2003; Rotheram-Borus et al. 1995; Strathdee et al. 1998) and substance use (Celentano et al. 2006; Thiede et al. 2003; Remafedi 1987; Rotheram-Borus et al. 1995; Rusch et al. 2004; Seage et al. 1998; Strathdee et al. 1998; Stueve et al. 2002) in this population. The results of these studies present an emerging picture in which YMSM are at significantly increased risk for HIV and a range of mood and substance use disorders which can often go unrecognized. Of particular interest is the possibility that these psychosocial problems combine to increase risk of unsafe sex and HIV infection (Stall et al. 2003).

To our knowledge, no recent studies have described the prevalence of depressive symptoms in YMSM while at the same time examining their utilization of mental health care, their rates of substance use and the specific sexual risk

behaviors they engage in which, together, may place them at higher risk of contracting HIV. It is this syndemic and the subsequent gap in the literature that we sought to address in this analysis.

The cross-sectional analysis presented utilizes baseline data from The EXPLORE Study—a national, multi-site HIV prevention intervention trial funded by the National Institutes of Health. Because of the large size and the racial/ethnic and age diversity of the EXPLORE cohort, we had sufficient power to thoroughly examine depressive symptoms, utilization of mental health care, substance use and HIV risk taking behaviors in YMSM and their older counterparts. The information derived from these analyses will aid in informing age-specific HIV prevention practices in the future.

Methods

Participants

The EXPLORE study was the first randomized trial designed to test the efficacy of a behavioral intervention specifically for MSM in preventing the acquisition of HIV using HIV incidence as the primary outcome measure (Chesney et al. 2003; EXPLORE Study Team 2004; Koblin et al. 2003). EXPLORE enrolled 4,295 participants in Boston, MA; Chicago, IL; Denver, CO; New York, NY; San Francisco, CA and Seattle, WA. Men were eligible for enrollment in the EXPLORE study if they were 16 years of age or older and had engaged in anal sex with another man during the past year. Men were excluded from the study if they had recently been involved in a mutually monogamous relationship for 2 years or more with an HIV-uninfected male partner. Details regarding study recruitment, baseline visits, data collection and management, and study monitoring have been described previously (Koblin et al. 2003).

Using an audio computer-assisted self-interview (ACASI) system, participants completed a psychosocial assessment battery, and provided details concerning sexual behavior, sexual self-efficacy (including sexual risk reduction and communication skills), social norms about safer sex, the rates and levels of enjoyment of specific sexual behaviors, and frequency of alcohol and drug use (Chesney et al. 2003).

Measures

Demographic data included participants’ age at enrollment (16–25 years, 26–35 years, 36–45 years, and 46 years+), EXPLORE recruitment site (Boston, Chicago, Denver, New York, San Francisco, or Seattle), race/ethnicity (White/not Hispanic, Black/not Hispanic, Hispanic, Asian/

Pacific Islander, Native American), highest level of education (high school degree or less, some college, college degree, some post college or graduate/professional degree), current student status (yes/no), current employment status (full-time, part-time, unemployed, or other), and household income (<\$12,000, \$12,000–\$29,999, \$30,000–\$59,999, or \$60,000+).

Participants were also asked to indicate the main reason why they joined EXPLORE. Participants were given a list of possible answers and were asked to mark only one choice. During analysis, participants' answers were grouped into one of four pre-determined categories: Free Care ("I will get free counseling," "I will get free HIV tests," "I will get compensated for participating in the study," "I will get current information about HIV research"), Altruism ("I feel like I am helping to stop the AIDS epidemic," "I think this is an important study," "I feel like I am giving to my community"), Concern about Risk ("I may feel more motivated to avoid risk-taking behavior") and Honor Those with HIV ("I will be doing something to honor people I know who have HIV or AIDS, or have died of AIDS") to assess the main reasons why participants chose to join EXPLORE.

Participants were screened for clinically significant depressive symptoms using a shortened version of the Center for Epidemiologic Studies Depression (CES-D)/National Institute of Mental Health scale (correlation with full CES-D = .92) (Mirowsky and Ross 1992). This measure asked respondents to rate how often during the past week [never/rarely (scale score = 1), sometimes (1–2 days; scale score = 2), often (3–4 days; scale score = 3), mostly or always (5–7 days; scale score = 4)] they felt like they could not shake off the blues even with help from their family or friends, had trouble keeping their minds on what they were doing, felt that everything they did was an effort, had trouble sleeping, felt lonely, felt sad or felt like they just couldn't "get going." This seven-item scale has been validated in the work of Ross and Mirowsky (1984, 2006) and the use and validity of additional short forms of the CES-D has been documented in additional manuscripts (Andresen et al. 1994; Boey 1999; Grzywacz et al. 2006; Irwin et al. 1999). However, because a cut-off point has not been established for this shortened version, in the current study, the additive score was constructed and a median split was created with higher scores representing more depressive symptoms.

Other mental health measures included in analyses as dichotomous indicators (yes/no) of utilization of mental health services were as follows: currently being on psychoactive medications to treat mood, anxiety or thought problems, currently being in counseling, having had past counseling, and currently being in self-help groups.

Participants answered questions about the frequencies of alcohol and non-prescription drug use for the 6 months

prior to enrollment. Heavy alcohol use was defined as having four or more drinks every day or six or more drinks on a typical day when drinking (Koblin et al. 2003). We categorized use of marijuana, poppers, crack cocaine, cocaine (snorted or sniffed), amphetamines, heroin, hallucinogens, and injection drugs in the last 6 months as follows: never used, used less than 3 days per week or used three or more days per week.

For the present analysis, numbers of male partners were dichotomized (>10 vs. <10 and >1 vs. 0, respectively) due to heavily skewed data. Based on the distribution of these data, a cutoff of 10 or more sexual partners was appropriate and in alignment with prior analyses that showed risk was highest in this group (Koblin et al. 2006).

Six variables were developed for addressing sexual risk with male partners who were perceived to be HIV-infected, uninfected or of unknown HIV status. The perceived HIV serostatus of partners was determined by asking participants: "how many of your male sex partners were HIV positive," how many of your male sex partners told you they were HIV-negative and you had *no reason* to doubt it" and "how many of your male sex partners never told you their HIV status or told you they were negative and you *have reason* to doubt it." Unprotected receptive anal sex with a male partner was assessed as follows: in the last 6 months "How many times did you have anal sex with your [HIV-infected, uninfected or unknown status] partner(s) when his/their penis was in your rectum? This would be with or without a condom and whether or not he/they ejaculated," "How many of these times did your partner(s) use a male condom or did you use an anal condom (Reality Condom[®])" [now known as the "Female Condom[™]" (Female Health Corporation 2008)] and "How many of these times did a condom slip off, tear, break or otherwise fail?". Unprotected insertive anal sex was assessed as follows: in the last 6 months "How many times did you have anal sex with your [HIV-infected, uninfected or unknown status] partner(s) when your penis was in his/their rectum? This would be with or without a condom and whether or not you ejaculated," "How many of these times did you use a male condom or did your partner(s) use an anal condom (Reality Condom[®])" and "How many of these times did a condom slip off, tear, break or otherwise fail?".

Data Analysis

The goal of this analysis was to describe the risk profile of the EXPLORE study's YMSM at baseline. To achieve this, we first used global Chi-square tests to examine independence between age groups and demographic variables. In addition, we assessed linear associations between age groups and substance use variables with the Mantel-Haenszel chi-square test. For categorizations resulting in

inadequate cell counts, we conducted exact tests to obtain *P*-values and 95% confidence intervals. Next, we constructed multivariable logistic regression models to estimate the association of age with depressive symptoms, utilization of mental health care, and sexual behaviors. To identify potential confounding variables to be included in the adjusted models, we constructed bivariate logistic regression models with each of the demographic variables in relation to our outcomes of interest. If the magnitude of the β coefficients for the outcome measure was altered by at least 10% we considered it to be a confounder (Sonis 1998). For all models, we designated the oldest men (46+ years of age)

as the referent group, and calculated the odds ratios and associated 95% confidence intervals for the younger age categories. Mediation analyses were not performed due to the cross-sectional nature of these data.

Results

Demographics

Nineteen percent of the entire EXPLORE study population were YMSM (16–25 years) (Table 1). The proportion of YMSM was greater in New York City and Seattle, while

Table 1 Demographic characteristics of the EXPLORE cohort

	Age group 1 16–25 (<i>n</i> = 814) <i>n</i> (%)	Age group 2 26–35 (<i>n</i> = 1,823) <i>n</i> (%)	Age group 3 36–45 (<i>n</i> = 1,159) <i>n</i> (%)	Age group 4 46+ (<i>n</i> = 499) <i>n</i> (%)	Test statistic
<i>Recruitment site</i>					$\chi^2 = 91.1^*$ (df = 15)
Boston	132 (16.2)	275 (15.1)	220 (19.0)	102 (20.4)	
Chicago	122 (15.0)	276 (15.1)	165 (14.2)	61 (12.2)	
Denver	125 (15.4)	290 (15.9)	206 (17.8)	105 (21.0)	
New York	181 (22.2)	355 (19.5)	153 (13.2)	48 (9.6)	
San Francisco	96 (11.8)	308 (16.9)	231 (19.9)	101 (20.2)	
Seattle	158 (19.4)	319 (17.5)	184 (15.9)	82 (16.4)	
<i>Race/ethnicity</i>					$\chi^2 = 191.2^*$ (df = 15)
White, not Hispanic	467 (57.4)	1316 (72.2)	893 (77.1)	436 (87.4)	
Black, not Hispanic	64 (7.9)	124 (6.8)	70 (6.0)	23 (4.6)	
Hispanic	209 (25.7)	292 (16.0)	123 (10.6)	28 (5.6)	
Asian/Pacific Islander	35 (4.3)	48 (2.6)	32 (2.8)	1 (0.2)	
Native American	12 (1.5)	7 (0.4)	10 (0.9)	2 (0.4)	
Other race	27 (3.3)	35 (1.9)	31 (2.7)	9 (1.8)	
<i>Education</i>					$\chi^2 = 577.2^*$ (df = 9)
High school degree or less	147 (18.1)	147 (8.1)	82 (7.1)	31 (6.2)	
Some college	387 (47.6)	419 (23.0)	223 (19.2)	100 (20.0)	
College degree	231 (28.4)	775 (42.5)	406 (35.0)	122 (24.5)	
Post college	48 (5.9)	481 (26.4)	448 (38.7)	246 (49.3)	
<i>Student status</i>					$\chi^2 = 338.3^*$ (df = 3)
Yes	297 (36.5)	277 (15.2)	95 (8.2)	31 (6.2)	
No	516 (63.5)	1546 (84.8)	1063 (91.8)	468 (93.8)	
<i>Employment status</i>					$\chi^2 = 277.9^*$ (df = 9)
Full-time	511 (62.8)	1477 (81.0)	928 (80.1)	331 (66.3)	
Part-time	148 (18.2)	154 (8.5)	76 (6.6)	48 (9.6)	
Unemployed	135 (16.6)	147 (8.1)	95 (8.2)	50 (10.0)	
Other	20 (2.5)	45 (2.5)	60 (5.2)	70 (14.0)	
<i>Annual household income</i>					$\chi^2 = 576.1^*$ (df = 9)
<\$12,000	238 (29.3)	160 (8.8)	99 (8.6)	65 (13.1)	
\$12,000–\$29,999	343 (42.2)	510 (28.0)	212 (18.3)	101 (20.3)	
\$30,000–\$59,999	185 (22.8)	818 (44.9)	475 (41.1)	178 (35.8)	
\$60,000+	47 (5.8)	333 (18.3)	371 (32.1)	153 (30.8)	

* *P* < .01

MSM from Boston and San Francisco tended to be older (36+ years). YMSM were more likely to be racially or ethnically diverse, with nearly 26% of YMSM indicating they were Hispanic/Latino, 8% reporting being Black, and 4% reporting being Asian/Pacific Islander. In contrast, 87% of the oldest group of men (46+ years) reported being White. YMSM reported the lowest employment rates and lower educational attainment. YMSM reported lower incomes, with 29.3% earning less than \$12,000 annually and 42.2% earning between \$12,000 and \$29,999 compared with the older men who earned considerably more (more than 30% in each the two oldest groups of men earned in excess of \$60,000 per year). All tests of independence between age groups and demographics were statistically significant (see Table 1). Additionally, YMSM were significantly more likely to have joined EXPLORE to access free care (21% of those who were 16–25, 13% of those who were 46+).

Substance and Alcohol Use

Among the YMSM in EXPLORE, 58.6% reported using marijuana in the 6 months prior to study entry, with 12.6% using marijuana three or more days per week. In contrast, marijuana use was least prevalent among the oldest men (35.6%). Approximately 40% of the YMSM reported using hallucinogens (including PCP, Ecstasy, angel dust, acid, LSD, mushrooms and Special K) in the 6 months prior to study entry compared to 6.4% of the oldest men. More than one-quarter of YMSM (26.4%) reported using cocaine compared to 7.0% among the oldest men. Amphetamine use was reported by YMSM more often (17.9%) compared to the other age groups, as was heavy alcohol use. Although snorting or smoking heroin was uncommon, YMSM reported doing so more often (2.0%) than the oldest men (0.2%). All of the trends above were statistically significant apart from crack cocaine (see Table 2).

Unlike trends for most other recreational drugs reported above, an inverse trend with age was observed for inhaled nitrates/poppers: 42.8% of oldest men reporting inhaled nitrate/popper use compared to 28.9% of YMSM. Similarly, older men (46+ years) were more likely to have injected any drugs, including steroids (12.9%) compared to 8.1% of YMSM (Table 2).

Mental Health Indicators and Utilization of Care

Mean scores for depression varied across age categories: (1) age group 16–25 (Mean = 13.84, SD = 4.24, Range = 7–28); (2) age group 26–35 (Mean = 12.85, SD = 4.27, Range = 7–28); (3) age group 36–45 (Mean = 12.81, SD = 4.27, Range = 7–28); (4) age group 46+ (Mean = 12.16, SD = 4.11, Range = 7–27).

As seen in Table 3, adjusting for potential confounders, compared with the oldest men (46+ years), each category of younger men (16–25 years, 26–35 years, and 36–45 years) was at increased odds of having a depression score above the sample median, with the youngest age group having the highest odds [Adj. OR = 1.55; 95% CI = 1.23, 1.97]. Additionally, the youngest MSM were less likely to receive psychoactive medication for their mood, anxiety, or thought problems [OR = 0.20; 95% CI = 0.14, 0.29], and were less likely to report current or past counseling [Adj. OR = 0.39; 95% CI = 0.28, 0.53 and Adj. OR = 0.67; 95% CI = 0.53, 0.84, respectively]. Likewise, the youngest MSM were more than 80% less likely to report attendance at self-help groups [Adj. OR = 0.17; 95% CI = 0.10, 0.29] compared to the oldest men.

Sexual Risk Behavior

When compared with the oldest men (46+ years) and adjusted for race and income, the youngest MSM were significantly less likely to report at least 10 male sex partners in the 6 months prior to study entry [Adj. OR = 0.58; 95% CI = 0.45, 0.73] (Table 4).

Accounting for potential confounders, the youngest MSM more often reported engaging in unprotected insertive [Adj. OR = 1.60; 95% CI = 1.24, 2.07] or receptive [Adj. OR = 2.07; 95% CI = 1.60, 2.68] anal intercourse with HIV-uninfected partners, and unprotected receptive [Adj. OR = 1.72; 95% CI = 1.30, 2.28] anal intercourse with partners of HIV-unknown status. The youngest MSM less often reported unprotected insertive anal intercourse with HIV-infected male sex partners [OR = 0.41; 95% CI = 0.28, 0.60]. Although not statistically significant, there was a trend towards lower rates of unprotected receptive anal intercourse with HIV-infected male partners among the youngest MSM [OR = 0.81; 95% CI = 0.50, 1.30].

Discussion

This cross-sectional analysis of baseline data from the EXPLORE study found that YMSM have greater propensity towards depressive symptoms, less utilization of mental health services and higher rates of substance use than their older counterparts. This analysis also pointed to YMSM having higher rates of unprotected receptive and insertive anal sex with partners of presumed HIV-negative status and higher rates of receptive anal sex with partners whose HIV status was unknown when compared with older MSM in the EXPLORE cohort.

Although we cannot infer causality from this data due to the descriptive nature of the analysis, the high rates of depressive symptoms, low utilization of mental health

Table 2 Alcohol and substance use in 6 months prior to study participation among the EXPLORE cohort

	Age group 1 16–25 (n = 814) n (%)	Age group 2 26–35 (n = 1823) n (%)	Age group 3 36–45 (n = 1159) n (%)	Age group 4 46+ (n = 499) n (%)	Test statistic
<i>Heavy alcohol use</i>					$\chi^2 = 17.8^*$ (df = 3)
Yes	112 (13.8)	202 (11.1)	97 (8.4)	42 (8.4)	
No	697 (86.2)	1615 (88.9)	1056 (91.6)	456 (91.6)	
<i>Marijuana</i>					$\chi^2 = 87.5^*$ (df = 6)
Never	337 (41.5)	964 (53.0)	679 (58.7)	320 (64.4)	
<3 day/week	374 (46.0)	703 (38.7)	393 (34.0)	144 (29.0)	
≥3 days/week	102 (12.6)	152 (8.4)	85 (7.4)	33 (6.6)	
<i>Poppers</i>					$\chi^2 = 40.5^*$ (df = 6)
Never	576 (71.1)	1169 (64.3)	687 (59.4)	285 (57.2)	
<3 day/week	223 (27.5)	598 (32.9)	439 (37.9)	196 (39.4)	
≥3 days/week	11 (1.4)	52 (2.9)	31 (2.7)	17 (3.4)	
<i>Crack cocaine</i>					$\chi^2 = 4.0$ (df = 6)
Never	772 (95.1)	1751 (96.3)	1101 (95.2)	480 (96.2)	
<3 day/week	36 (4.4)	62 (3.4)	52 (4.5)	17 (3.4)	
≥3 days/week	4 (0.5)	5 (0.3)	4 (0.4)	2 (0.4)	
<i>Cocaine</i>					$\chi^2 = 103.0^*$ (df = 6)
Never	598 (73.6)	1410 (77.6)	988 (85.4)	464 (93.0)	
<3 day/week	210 (25.8)	398 (21.9)	164 (14.2)	34 (6.8)	
≥3 days/week	5 (0.6)	9(0.5)	5 (0.4)	1 (0.2)	
<i>Amphetamines</i>					$\chi^2 = 55.4^*$ (df = 6)
Never	667 (82.0)	1557 (85.7)	1033 (89.4)	474 (95.0)	
<3 day/week	136 (16.7)	243 (13.4)	116 (10.0)	24 (4.8)	
≥3 days/week	10 (1.2)	16 (0.9)	6 (0.5)	1 (0.2)	
<i>Heroin</i>					$\chi^2 = 21.5^*$ (df = 6)
Never	797 (98.0)	1806 (99.3)	1151 (99.5)	498 (99.8)	
<3 day/week	12 (1.5)	12 (0.7)	6 (0.5)	1 (0.2)	
≥3 days/week	4 (0.5)	1 (0.1)	0 (0.0)	0 (0.0)	
<i>Hallucinogens</i>					$\chi^2 = 251.9^*$ (df = 6)
Never	491 (60.4)	1326 (72.9)	974 (84.2)	467 (93.6)	
<3 day/week	314 (38.6)	486 (26.7)	183 (15.8)	32 (6.4)	
≥3 days/week	8 (1.0)	6 (0.3)	0 (0.0)	0 (0.0)	
<i>Injection drugs</i>					$\chi^2 = 21.5^*$ (df = 3)
Yes	66 (8.1)	159 (8.7)	150 (13.0)	64 (12.9)	
No	746 (91.9)	1661 (91.3)	1006 (87.0)	434 (87.2)	

* $P < .01$

services, high rates of substance use and high rates of sexual risk taking behaviors among the YMSM in this cohort may, combined, place YMSM at greater risk of contracting HIV.

Our findings in EXPLORE corroborate other research that has been conducted concerning depressive symptomatology in young men. In the general population, younger age among males has been associated with depressive symptomatology (Radloff 1991; Wight et al. 2004), low health care utilization (Callahan and Cooper 2005; Ford et al. 1999), substance use (Ellickson et al. 2003;

Kosterman et al. 2000; Grant and Dawson 1998; Hawkins et al. 1992), and sexual risk behaviors (CDC 2006; Lehrer et al. 2006; MDE 2006). Young adult MSM are at disproportionate risk for these health risks and behaviors relative to their heterosexual peers, including depression, suicide, and victimization (Garofalo et al. 1999; Mustanski et al. 2007); decreased health care utilization and access (Rhodes et al. 2007), multiple substance use (Clatts et al. 2005; Hatzenbuehler et al. 2008; Marshal et al. 2008), and HIV/STI sexual risk behavior (Celentano et al. 2006; Valleroy et al. 2000).

Table 3 Associations of age with mental health indicators and utilization of care: EXPLORE 1999–2001

Indicator	Prevalence of risk factors by age group <i>n</i> (%)	Adjusted odds ratio	95% confidence interval
Depressive symptoms (above versus below median level; <i>n</i> = 4,288) ^a			
16–25 years	462 (56.83)	1.55**	(1.23, 1.97)
26–35 years	830 (45.60)	1.25*	(1.02, 1.54)
36–45 years	542 (46.80)	1.43**	(1.15, 1.78)
46+ years	196 (39.28)	1.0	
Currently receiving psychoactive medications (<i>n</i> = 4,294) ^b			
16–25 years	42 (5.16)	0.20**	(0.14, 0.29)
26–35 years	222 (12.18)	0.51**	(0.39, 0.66)
36–45 years	210 (18.12)	0.81	(0.63, 1.05)
46+ years	107 (21.44)	1.0	
Currently receiving counseling (<i>n</i> = 4,295) ^c			
16–25 years	79 (9.71)	0.39**	(0.28, 0.53)
26–35 years	318 (17.44)	0.72**	(0.57, 0.92)
36–45 years	276 (23.04)	1.00	(0.78, 1.28)
46+ years	119 (23.85)	1.0	
Received counseling in the past (<i>n</i> = 4,294) ^c			
16–25 years	416 (51.11)	0.67**	(0.53, 0.84)
26–35 years	1058 (58.04)	0.83*	(0.68, 1.02)
36–45 years	770 (66.44)	1.18	(0.94, 1.47)
46+ years	318 (63.86)	1.0	
Attending self-help groups (<i>n</i> = 4,288) ^a			
16–25 years	19 (2.33)	0.17**	(0.10, 0.29)
26–35 years	101 (5.54)	0.54**	(0.37, 0.77)
36–45 years	141 (12.17)	1.39*	(0.98, 1.97)
46+ years	48 (9.62)	1.0	

^a Adjusted for reported income level

^b No adjustment needed

^c Adjusted for race

* $P < .05$; ** $P < .01$

In the EXPLORE cohort, YMSM were more likely to experience depressive symptoms than their older MSM counterparts. Although the modified CES-D measure that was used in EXPLORE was only able to assess for depressive symptoms as opposed to serving as a diagnostic tool for depression, our findings suggest that YMSM's general state of mental health may be less stable than that of older MSM. As noted in previous writings (Perdue et al. 2003; Rotheram-Borus et al. 1995; Strathdee et al. 1998), depressive symptoms may impact self-esteem, self-assertion and self-protective behaviors and may contribute to greater rates of substance use and other risk-taking behaviors among YMSM.

Higher rates of depressive symptoms combined with lower rates of utilization of individual and group counseling and psychopharmacology point to significant gaps in many YMSM's use of mental health care. Although generalizability may be reduced by the fact that many YMSM

enrolled in EXPLORE to access free care, these findings suggest that the younger men in this cohort who were experiencing depressed mood may not have had access to the social resources and support that they needed. YMSM's low utilization of mental health services may be due to their lower socioeconomic status, lack of medical insurance or lack of comfort with seeking out mental health treatment. Additionally, navigating the transition from pediatric to adult care may serve as an additional challenge to men in this age group who are attempting to access mental health care. Those YMSM who are experiencing depressive symptoms but not getting treated for them may self-medicate seeking out substances or sex as ways to improve their states of mind.

In the EXPLORE cohort, YMSM were more likely than their older counterparts to have reported heavy alcohol use as well as use of marijuana, hallucinogens, cocaine and amphetamines. Many studies (Celentano et al. 2006; Rotheram-Borus et al. 1995; Rusch et al. 2004; Seage et al.

Table 4 Association of age with sexual behaviors among the EXPLORE cohort

Sexual behaviors (in last 6 months)	Prevalence of risk factors by age group <i>n</i> (%)	Adjusted odds ratio	95% confidence interval
Ten or more male sex partners^a			
16–25 years	254 (31.24)	0.58*	(0.45, 0.73)
26–35 years	790 (43.38)	0.86	(0.70, 1.05)
36–45 years	526 (45.38)	0.89	(0.72, 1.10)
46+ years	242 (48.50)	1.0	
One or more female sex Partners^b			
16–25 years	65 (8.00)	1.25	(0.75, 2.09)
26–35 years	47 (2.58)	0.51*	(0.31, 0.86)
36–45 years	42 (3.62)	0.72	(0.43, 1.22)
46+ years	24 (4.81)	1.0	
Unprotected insertive anal intercourse with HIV negative male partner^a			
16–25 years	280 (34.87)	1.60*	(1.24, 2.07)
26–35 years	616 (33.90)	1.34*	(1.07, 1.67)
36–45 years	365 (31.68)	1.14	(0.91, 1.44)
46+ years	145 (29.06)		
Unprotected receptive anal intercourse with HIV negative male partner^a			
16–25 years	307 (38.14)	2.07*	(1.60, 2.68)
26–35 years	613 (33.77)	1.57*	(1.25, 1.97)
36–45 years	322 (27.98)	1.17	(0.92, 1.49)
46+ years	127 (25.50)	1.0	
Unprotected insertive anal intercourse with HIV unknown male partner^c			
16–25 years	248 (30.66)	1.02	(0.80, 1.30)
26–35 years	598 (32.97)	1.13	(0.92, 1.41)
36–45 years	361 (31.23)	1.05	(0.83, 1.32)
46+ years	150 (30.24)	1.0	
Unprotected receptive anal intercourse with HIV unknown male partner^d			
16–25 years	241 (29.75)	1.72*	(1.30, 2.28)
26–35 years	500 (27.58)	1.62*	(1.26, 2.08)
36–45 years	241 (20.83)	1.16	(0.89, 1.51)
46+ years	93 (18.67)	1.0	
Unprotected insertive anal intercourse with HIV positive male partner^c			
16–25 years	50 (6.19)	0.41*	(0.28, 0.60)
26–35 years	166 (9.13)	0.62*	(0.46, 0.84)
36–45 years	166 (14.34)	1.04	(0.77, 1.41)
46+ years	69 (13.88)	1.0	
Unprotected receptive anal intercourse with HIV positive male partner^c			
16–25 years	41 (5.08)	0.81	(0.50, 1.30)
26–35 years	106 (5.82)	0.93	(0.62, 1.41)
36–45 years	76 (6.56)	1.06	(0.69, 1.63)
46+ years	31 (6.24)	1.0	

^a Adjusted for race and income^b Adjusted for race, income, and education level^c No adjustment needed^d Adjusted for reported income level* $P < .01$

1998; Strathdee et al. 1998; Stueve et al. 2002) have pointed to the correlation of substance use and sexual risk in YMSM. Substance use may lower inhibitions, decrease inter-partner

communication and reduce users' abilities to negotiate condom use in sexual situations. YMSM's high rates of substance use therefore places them at particular risk for HIV.

In EXPLORE, YMSM showed higher rates of unprotected insertive and receptive anal sex with presumed HIV negative partners and higher rates of unprotected receptive anal sex with partners whose status was unknown. These findings about YMSM are corroborated by other recent studies that suggest that younger men may actually know the serostatus of their partners less frequently than their older counterparts do, and may make choices about their behaviors based upon misperceptions or lack of knowledge about their partner's serostatus, thus placing them at greater risk for contracting HIV (Bingham et al. 2002; NAID 1993; Sifakis et al. 2005).

Because we analyzed baseline data from the EXPLORE study only, we cannot infer causality from these findings. Further examination of the longitudinal data from this and other studies may support the hypothesis that higher rates of depressive symptoms, lower utilization of mental health services and higher rates of substance use contribute to higher rates of HIV risk-taking behaviors (and thus higher rates of HIV acquisition) among YMSM.

Certain cohort limitations exist due to two additional recruitment-created biases in the EXPLORE study. First, due to their age, older MSM are more likely than YMSM to have been in long-term relationships. In EXPLORE, MSM were excluded from the study if they had recently been involved in a mutually monogamous relationship for two years or more with an HIV-uninfected male partner, but were not excluded if their long-term partners were HIV-infected. Secondly, because older MSM are more likely than YMSM to be aware of their HIV-infected status (MacKellar et al. 2005), older MSM in this cohort may have been more likely to have partnered with known HIV-infected partners while younger men may have been more likely to have partnered with assumed HIV-uninfected partners or partners of unknown HIV status.

Limitations also exist in certain measures used in data collection for this study. The abbreviated form of the CES-D used in EXPLORE can only measure for depressive symptoms and cannot diagnose depression. Additionally, the questions asked to ascertain participant knowledge about partner status allow for broad interpretation and therefore may not have fully captured how partner serostatus impacts sexual decision-making and risk. Further research which looks more specifically at the ways YMSM ascertain partner HIV status and how this, in turn, affects their sexual decision-making should also be done to address this limitation of the current study.

Limitations notwithstanding, the present findings point to important gaps in the support systems available to and used by YMSM. Our findings about depressive symptoms, utilization of mental health care and substance use by YMSM suggest the need for more appropriate and accessible mental health and substance use services for this population.

These findings also suggest that HIV prevention work with younger MSM should provide comprehensive education about HIV testing as well as risk reduction counseling that focuses on communication about serostatus and safety in sexual situations.

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References

- Andresen, E. M., Malmgren, J. A., Certer, W. B., & Patrick, D. L. (1994). Screening for depression in well older adults: evaluation of a short form of the CES-D (Center for Epidemiologic Studies Depression Scale). *American Journal of Preventive Medicine, 10*, 77–84.
- Bingham, T., McFarland, W., Shehan, D. A., LaLota, M., Celentano, D. D., & Koblin, B. A. (2002). Unrecognized HIV infection, risk

- behaviors, and perceptions of risk among young black men who have sex with men—six U.S. cities, 1994–1998. *Morbidity and Mortality Weekly Report*, 51, 733–736.
- Boey, K. W. (1999). Cross-validation of a short form of the CES-D in Chinese elderly. *International Journal of Geriatric Psychiatry*, 14, 608–617. doi:10.1002/(SICI)1099-1166(199908)14:8<608::AID-GPS991>3.0.CO;2-Z.
- Botnick, M. R., Heath, K. V., Cornelisse, P. G., Strathdee, S. A., Martindale, S. L., & Hogg, R. S. (2002). Correlates of suicide attempts in an open cohort of young men who have sex with men. *Canadian Journal of Public Health*, 93, 59–62.
- Callahan, S. T., & Cooper, W. O. (2005). Uninsured and health care access among young adults in the United States. *Pediatrics*, 116, 88–95. doi:10.1542/peds.2004-1449.
- Celentano, D. D., Valleroy, L. A., Sifakis, F., MacKellar, D. A., Hylton, J., & Thiede, H. (2006). Associations between substance use and sexual risk among very young men who have sex with men. *Sexually Transmitted Diseases*, 33, 265–271.
- Centers for Disease Control and Prevention. (2006). Trends in HIV-related risk behaviors among high school students—United States, 1991–2005. *MMWR. Morbidity and Mortality Weekly Report*, 55, 851–854.
- Chen, S. Y., Weide, D., & McFarland, W. (2003). Are the recent increases in sexual risk behavior among older or younger men who have sex with men? Answer: both. *AIDS (London, England)*, 17, 942–943.
- Chesney, M. A., Koblin, B. A., Barresi, P. J., Husnik, M. J., Celum, C. L., & Colfax, G. (2003). An individually tailored intervention for HIV prevention: baseline data from the EXPLORE study. *American Journal of Public Health*, 93, 933–938.
- Clatts, M. C., Goldsamt, L. A., & Yi, H. (2005). Club drug use among young men who have sex with men in NYC: A preliminary epidemiological profile. *Substance Use & Misuse*, 40, 1317–1330. doi:10.1081/JA-200066898.
- Collins, C. (1997). *Dangerous Inhibitions: How America is letting AIDS become an epidemic of the young*. Monograph Series, Occasional Paper #3, Harvard AIDS Institute and Center for AIDS Prevention Studies, University of California, San Francisco. Accessed July 25, 2008 from, <http://www.caps.ucsf.edu/pubs/reports/pdf/DangerInhib.pdf>.
- Dudley, M. G., Rostosky, S. S., Korfhage, B. A., & Zimmerman, R. S. (2004). Correlates of high-risk sexual behavior among young men who have sex with men. *AIDS Education and Prevention*, 16, 328–340. doi:10.1521/aeap.16.4.328.40397.
- Ellickson, P., Tucker, J., & Klein, D. (2003). Ten-year prospective study of public health problems associated with early drinking. *Pediatrics*, 111, 949–955. doi:10.1542/peds.111.5.949.
- Female Health Corporation. (2008). FC and FC2 female condoms. Accessed July 3, 2008 from, <http://www.femalehealth.com/theproduct.html>.
- Ford, C. A., Bearman, P. S., & Moody, J. (1999). Foregone health care among adolescents. *Journal of the American Medical Association*, 282, 2227–2234. doi:10.1001/jama.282.23.2227.
- Garofalo, R., Wolf, R. C., Wissow, L. S., Woods, E. R., & Goodman, E. (1999). Sexual orientation and risk of suicide attempts among a representative sample of youth. *Archives of Pediatrics & Adolescent Medicine*, 155, 487–493.
- Gibson, P. (1989). Gay male and lesbian youth suicide. In M. R. Feinleib (Ed.), *Report of the secretary's task force on youth suicide* (Vol. 3). Rockville, MD: U.S. Department of Health and Human Services.
- Grant, B., & Dawson, D. (1998). Age at onset of alcohol use and its association with DSM-IV alcohol abuse and dependence: Results from the National Longitudinal Alcohol Epidemiologic Survey. *Journal of Substance Abuse*, 9, 103–110. doi:10.1016/S0899-3289(97)90009-2.
- Grzywacz, J. G., Hovey, J. D., Seligman, L. D., Arcury, T. A., & Quandt, S. A. (2006). Evaluating short-form versions of the CES-D for measuring depressive symptoms among immigrants from Mexico. *Hispanic Journal of Behavioral Sciences*, 28, 404–424. doi:10.1177/0739986306290645.
- Hatzenbuehler, M. L., Corbin, W. R., & Fromme, K. (2008). Trajectories and determinants of alcohol use among LGB young adults and their heterosexual peers: Results from a prospective study. *Developmental Psychology*, 44, 81–90. doi:10.1037/0012-1649.44.1.81.
- Hawkins, J. D., Catalano, R. F., & Miller, J. R. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin*, 112, 64–105. doi:10.1037/0033-2909.112.1.64.
- Irwin, M., Artin, K. H., & Oxman, M. N. (1999). Screening for depression in the older adult: criterion validity of the 10-item Center for Epidemiological Studies Depression Scale (CES-D). *Archives of Internal Medicine*, 159, 1701–1704. doi:10.1001/archinte.159.15.1701.
- Katz, M. H., McFarland, W., Guillin, V., Fenstersheib, M., Shaw, M., & Kellogg, T. (1998). Continuing high prevalence of HIV and risk behaviors among young men who have sex with men: The Young Men's Survey in the San Francisco Bay Area in 1992 to 1993 and in 1994 to 1995. *Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology*, 19, 178–181.
- Kipke, M. D., Kubiak, K., Weiss, G., Wong, C., Lopez, D., & Iverson, E. (2007). The health and behaviors of young men who have sex with men. *The Journal of Adolescent Health*, 40, 342–350. doi:10.1016/j.jadohealth.2006.10.019.
- Koblin, B. A., Chesney, M. A., Husnik, M. J., Bozeman, S., Celum, C. L., & Buchbinder, S. (2003). High risk behaviors among men who have sex with men in six cities in the United States: Baseline data from the EXPLORE study. *American Journal of Public Health*, 93, 926–932.
- Koblin, B. A., Husnik, M. J., Colfax, G., Huang, Y., Madison, M., & Mayer, K. (2006). Risk factors for HIV infection among men who have sex with men. *AIDS (London, England)*, 20, 731–739. doi:10.1097/01.aids.0000216374.61442.55.
- Kosterman, R., Hawkins, J. D., Guo, J., Catalano, R., & Abbott, R. D. (2000). The dynamics of alcohol and marijuana initiation: patterns and predictors of first use in adolescence. *American Journal of Public Health*, 90, 360–366.
- Lehrer, J. A., Shrier, L. A., Gortmaker, S., & Buka, S. (2006). Depressive symptoms as a longitudinal predictor of sexual risk behaviors among US middle and high school students. *Pediatrics*, 118, 189–200. doi:10.1542/peds.2005-1320.
- Lemp, G. F., Hirozawa, A. M., Givertz, D., Nieri, G. N., Anderson, L., & Lindegren, M. L. (1994). Seroprevalence of HIV and risk behaviors among young homosexual and bisexual men: The San Francisco/Berkeley Young Men's Survey. *Journal of the American Medical Association*, 272, 449–454. doi:10.1001/jama.272.6.449.
- MacKellar, D. A., Valleroy, L. A., Secura, G. M., Behel, S., Bingham, T., & Celentano, D. D. (2005). Unrecognized HIV infection, risk behaviors and perceptions of risk among young men who have sex with men: Opportunities for advancing HIV prevention in the third decade of HIV/AIDS. *Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology*, 38, 603–614.
- Manserg, G., Marks, G., Miller, L., Appleby, P. R., & Murphy, S. (2002). Is “knowing people with HIV/AIDS” associated with safer sex in men who have sex with men? *AIDS (London, England)*, 14, 1845–1851.
- Marshal, M. P., Friedman, M. S., Stall, R., King, K. M., Miles, J., & Gold, M. A. (2008). Sexual orientation and adolescent substance

- use: A meta-analysis and methodological review. *Addiction (Abingdon, England)*, 103, 546–556.
- Massachusetts Department of Education. (2006). 2005 Massachusetts youth risk behavior survey results. Accessed April 11, 2008 from, <http://www.doe.mass.edu/cnp/hprograms/yrbs/05/default.html>.
- McFarland, W., Katz, M. H., Stoyanoff, S. R., Shehan, D. A., LaLota, M., & Celentano, D. D. (2001). HIV incidence among young men who have sex with men—seven U.S. cities, 1994–2000. *MMWR Weekly*, 50, 440–444.
- Mirowsky, J., & Ross, C. E. (1992). Age and depression. *Journal of Health and Social Behavior*, 33, 187–205. doi:10.2307/2137349.
- Mustanski, B., Garofalo, R., Herrick, A., & Donenberg, G. (2007). Psychosocial health problems increase risk for HIV among urban young men who have sex with men: Preliminary evidence of a syndemic in need of attention. *Annals of Behavioral Medicine*, 34, 37–45. doi:10.1007/BF02879919.
- National Institute of Allergy and Infectious Diseases, National Institute of Health. (1993). Young gay men not heeding AIDS message, rates of infection remains high. News from NIAID, ND, 930609, pp. 1–2.
- New York City Department of Health and Mental Hygiene. (2007). New diagnoses rising in New York City among young men who have sex with men (September 11). Press Release # 079-07. Available: <http://www.nyc.gov/html/doh/html/pr2007/pr079-07.shtml>.
- Noell, J. W., & Ochs, L. M. (2001). Relationship of sexual orientation to substance use, suicidal ideation, suicide attempts, and other factors in a population of homeless adolescents. *The Journal of Adolescent Health*, 29, 31–36. doi:10.1016/S1054-139X(01)00205-1.
- Perdue, T., Hagan, H., & Theide, H. (2003). Depression and HIV risk behavior among Seattle-area injection drug users and young men who have sex with men. *AIDS Education and Prevention*, 15, 81–92. doi:10.1521/aeap.15.1.81.23842.
- Radloff, L. S. (1991). The use of the Center for Epidemiological Studies Depression Scale in adolescents and young adults. *Journal of Youth and Adolescence*, 20, 149–166. doi:10.1007/BF01537606.
- Remafedi, G. (1987). Adolescent homosexuality: psychosocial and medical implications. *Pediatrics*, 79(3), 331–337.
- Remafedi, G. (1999). Sexual orientation and youth suicide. *Journal of the American Medical Association*, 282, 1291–1292. doi:10.1001/jama.282.13.1291.
- Rhodes, S. F., McCoy, T., Hergenrather, K. C., Omli, M. R., & Durant, R. H. (2007). Exploring the health behavior disparities of gay men in the United States: Comparing gay male university students to their heterosexual peers. *Journal of LGBT Health Research*, 3, 15–23. doi:10.1300/J463v03n01_03.
- Ross, C. E., & Mirowsky, J. (1984). Components of depressed mood in married men and women: The Center for Epidemiologic Studies' Depression Scale. *American Journal of Epidemiology*, 119, 997–1004.
- Ross, C. E., & Mirowsky, J. (2006). Sex differences in the effect of education on depression: Resource multiplication or resource substitution? *Social Science & Medicine*, 63, 1400–1413. doi:10.1016/j.socscimed.2006.03.013.
- Rotheram-Borus, M. J., Rosario, Reid, H., & Koopman, C. (1995). Predicting patterns of sexual acts among homosexual and bisexual youths. *The American Journal of Psychiatry*, 152, 588–595.
- Rusch, M., Lampinen, T. M., Schilder, A., & Hogg, R. S. (2004). Unprotected anal intercourse associated with recreational drug use among young men who have sex with men depends on partner type and intercourse role. *Sexually Transmitted Diseases*, 31, 492–498. doi:10.1097/01.olq.0000135991.21755.18.
- Safren, S. A., & Heimberg, R. G. (1999). Depression, hopelessness, suicidality and related factors in sexual minority and heterosexual adolescents. *Journal of Consulting and Clinical Psychology*, 67, 859–866. doi:10.1037/0022-006X.67.6.859.
- Seage, G. R., Mayer, K. H., Wold, C., Lenderking, W. R., Goldstein, R., & Cai, B. (1998). The social context of drinking, drug use, and unsafe sex in the Boston Young Men Study. *Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology*, 17, 368–375.
- Seal, D. W., Kelly, J. A., Bloom, F. R., Stevenson, L. Y., Coley, B. I., & Broyles, L. A. (2000). HIV prevention with young men who have sex with men: what young men themselves say is needed. *AIDS Care*, 12, 5–26. doi:10.1080/09540120047431.
- Sifakis, F., Flynn, C. P., Metsch, L., LaLota, M., Murrill, C., & Koblin, B. A. (2005). HIV prevalence, unrecognized infection and HIV testing among men who have sex with men—five U.S. cities, June 2004–April 2005. *MMWR Weekly*, 54, 597–601.
- Sonis, J. (1998). A closer look at confounding. *Family Medicine*, 30, 584–588.
- Stall, R., Thomas, M. C., Williamson, J., Hart, T., Greenwood, G., & Paul, J. (2003). Association of co-occurring psychosocial health problems and increased vulnerability to HIV/AIDS among urban men who have sex with men. *American Journal of Public Health*, 90, 939–942.
- Strathdee, S. R., Hogg, R. S., Martindale, S. L., Cornelisse, P. G. A., Craib, K. J. P., & Montaner, J. S. G. (1998). Determinants of sexual risk taking among young HIV negative gay and bisexual men. *Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology*, 19, 61–66.
- Stueve, A., O'Donnell, L., Duran, R., San Doval, A., & Geier, J. (2002). Being high and taking sexual risks: findings from a multisite survey of urban young men who have sex with men. *AIDS Education and Behavior*, 14, 482–495. doi:10.1521/aeap.14.8.482.24108.
- The EXPLORE Study Team. (2004). Effects of a behavioural intervention to reduce acquisition of HIV infection among men who have sex with men: the EXPLORE randomised controlled Study. *Lancet*, 364, 41–50. doi:10.1016/S0140-6736(04)16588-4.
- Thiede, H., Valleroy, L. A., MacKellar, D. A., Celentano, D. D., Ford, W. L., & Hagan, H. (2003). Regional patterns and correlates of substance use among young men who have sex with men in 7 US urban areas. *American Journal of Public Health*, 93, 1915–1921.
- Valleroy, L. A., MacKellar, D. A., Karon, J. M., Rosen, D. H., McFarland, W., & Shehan, D. A. (2000). HIV prevalence and associated risks in young men who have sex with men. *Journal of the American Medical Association*, 284, 198–204. doi:10.1001/jama.284.2.198.
- Webster, R. D., Darrow, W. W., Paul, J. P., Roark, R. A., Woods, W. J., & Stempel, R. R. (2003). HIV infection and associated risks among young men who have sex with men in a Florida resort community. *Journal of Acquired Immune Deficiency Syndromes*, 33, 223–331. doi:10.1097/00126334-200306010-00018.
- Wight, R. G., Sepulveda, J. E., & Aneshensel, C. S. (2004). Depressive symptoms: how do adolescents compare with adults? *The Journal of Adolescent Health*, 34, 314–323.