ARTICLE

Associations Between Health Risk Behaviors and Opposite-, Same-, and Both-Sex Sexual Partners in Representative Samples of Vermont and Massachusetts High School Students

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Objective: To examine associations between health risk behaviors and sexual experience with opposite-, same-, or both-sex partners in representative samples of high school students.

Design: We used 1995 and 1997 data from the Vermont and Massachusetts Youth Risk Behavior Surveys. Logistic regression and multiple regression analyses were used to compare health risk behaviors among students who reported sex with opposite-sex partners only (opposite-sex students), with same-sex partners only (same-sex students), and with both male and female sexual partners (both-sex students).

Setting: Public high schools in Vermont and Massachusetts.

Participants: Representative, population-based samples of high school students. The combined samples had 14623 Vermont students and 8141 Massachusetts students.

Main Outcome Measure: Violence, harassment, suicidal behavior, alcohol and other drug use, and unhealthy weight control practices.

Results: In both states, both-sex students were significantly more likely to report health risk behaviors than were opposite-sex students. For example, both-sex students had odds 3 to 6 times greater than opposite-sex students of being threatened or injured with a weapon at school, making a suicide attempt requiring medical attention, using cocaine, or vomiting or using laxatives to control their weight. In both states, same-sex students were as likely as opposite-sex students to report most health risk behaviors.

Conclusion: Relative to opposite- and same-sex students, both-sex students may be at elevated risk of injury, disease, and death by experiencing serious harassment and engaging in violence, suicidal behavior, alcohol and other drug use, and unhealthy weight control practices.

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SEXUAL MINORITY youth (ie, gay, lesbian, bisexual, or those still questioning their sexual orientation) face a disproportionate number of health risks compared with their heterosexual peers. Studies using community- and population-based samples have found that these young people are more likely to experience violence and harassment,[1-4] suicidal ideation and behavior,[5-8] alcohol and other substance use,[1-3] unhealthy weight control practices and negative body image,[3,8,9] and forced sexual intercourse[3,8,10] than are their heterosexual peers. Such health risks occur both in and out of school and are accompanied by more academic problems.[11]

Studies documenting health risks among these youth have used a variety of measures to identify those who are gay, lesbian, or bisexual. Self-reported sexual identity, such as gay, lesbian, bisexual, heterosexual, or questioning, allows all youth, not just those who are sexually active, to be classified. As Russell et al[11] point out, however, such measures may misclassify youth who do not yet self-identify as gay, lesbian, or bisexual but who do later. Another, broader measure is sexual orientation, including fantasies, social and political affiliations, and reports of romantic or sexual attraction to members of the same or opposite sex.[12] Measures of sexual orientation vary, however, and some include behavior. Some researchers treat orientation as synonymous with identity, but this seems inappropriate, as being attracted to and fantasizing about particular sexual partners may occur without adoption of an associated identity. Like sexual identity, sexual orientation has the advantage of including youth who are not sexually experienced. A third measure, sexual behavior, includes reports of sexual activity with members of the

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PARTICIPANTS, MATERIALS, AND METHODS

To maximize the number of students who report engaging in same-sex and both-sex sexual behavior, data for Vermont were obtained by combining data from the 1995 and 1997 Vermont YRBSs. Similarly, data for Massachusetts were obtained by combining the 1995 and 1997 Massachusetts YRBSs. Each state's YRBS measures the prevalence of health risk behaviors among its public high school students. Both states used a 2-stage cluster sample design to produce a representative sample of 9th- to 12th-grade students.

Across the 4 cross-sectional surveys, sample sizes ranged from 3982 to 8636, and response rates ranged from 74% to 94% for schools, 77% to 85% for students, and from 63% to 72% overall. Students completed the self-administered, voluntary, anonymous questionnaire in classrooms. A more complete discussion of the survey methods has been presented elsewhere.[15,16]

The questionnaires varied slightly across years and sites, but all included items assessing demographic information, sexual behaviors, harassment, violence, suicidal behaviors, alcohol and other drug use, and dietary behaviors. These items demonstrated good test-retest reliability.[17] In both Massachusetts surveys, students were asked, "The person(s) with whom you have had sexual contact is (are): (a) I have not had sexual contact with anyone, (b) Female(s), (c) Male(s), (d) Females and males." Sexual identity was assessed by asking, "Which of the following best describes you? (a) Heterosexual (straight), (b) Gay or lesbian, (c) Bisexual, (d) Not sure." In the 1995 Vermont survey, all students were asked, "During your life, with how many males have you had sexual intercourse?" and "During your life, with how many females have you had sexual intercourse?" We combined these responses with the sex of the respondent to determine opposite-sex, same-sex, and both-sex sexual behavior. In the 1997 Vermont YRBS, students were asked, "The persons you have had sexual activity with are: (a) I have not had sexual activity with anyone, (b) Females, (c) Males, (d) Females and males." Each respondent was classified as having had exclusively opposite-sex contact, exclusively same-sex contact, sexual contact with both sexes, or no sexual contact. The Vermont YRBS did not include a question on sexual identity in either survey.

Data were weighted to adjust for school and student nonresponse. Prevalence estimates, odds ratios (ORs), and 95% confidence intervals (CIs) were calculated using SUDAAN (Survey Data Analysis), which accounts for the complex sampling design and weighting.[18] Prevalence estimates were considered to be significantly different if their 95% CIs did not overlap. Logistic and multiple regression models that controlled for age, gender, and forced sexual intercourse were used to identify statistically significant differences in the prevalence of other health risk behaviors among students, or the total number of health risk behaviors, comparing same-sex and both-sex students to opposite-sex students. No interactions could be assessed in the logistic or multiple regressions because of the small number of same-sex and both-sex students, and we were unable to stratify the analyses by gender for the same reason. Multiple risk behaviors were assessed by dichotomously coding each risk behavior as 0 (if not occurring) or 1 (if it occurred 1 or more times). A multiple risk variable index was constructed by summing the dichotomous scores across health risk behaviors. Forced sex was controlled for in the regression analyses because of the high prevalence of reports of this event among same-sex and both-sex students. All variables were entered into the equations simultaneously.

same or opposite sex. This measure is narrower than identity and orientation and can be used only among sexually experienced youth. These 3 measures include different, but overlapping, groups of youth and may not necessarily be highly associated with each other. Studies have found that health risk behaviors are significantly more common among youth whose sexual identities,[3-6,8,9] orientations,[7,10,11] or behaviors[1,2] include same-sex sexuality.

To date, most studies examining health risk behaviors among sexual minority youth have combined all youth reporting same-sex sexuality, but there may be significant differences between these groups. These differences are critical to public health and education professionals who want to target health risk reduction programs and services toward youth who face the highest risk for undesirable health outcomes. Among the few studies that have disaggregated these groups of youth, one used a nationally representative sample in finding that bisexual orientation was more associated than gay, lesbian, or heterosexual orientation with school troubles such as not paying attention, or completing homework, or getting along with other students, and, among male bisexuals, feeling disliked and having lower grades.[11] Another study used a convenience sample in finding that self-identified bisexual youth were significantly more likely than their gay or lesbian peers to make more than one suicide attempt during their lifetime.[13]

Using 1995 and 1997 data from the Vermont and Massachusetts Youth Risk Behavior Surveys (YRBSs), we compared the frequency of selected health risk behaviors among sexually experienced youth who reported experience with opposite-sex partners only (opposite-sex students), those who reported experience with same-sex partners only (same-sex students), and those who reported experience with both same- and opposite-sex partners (both-sex students). We use these terms to describe each group of students simply based on their reported sexual behaviors. A behavioral measure of sexuality was used because it was included in both the Vermont and Massachusetts YRBSs.

To our knowledge, this article is one of the first to differentiate between same-sex and both-sex students in population-based samples. Two years of data were combined for Vermont and for Massachusetts to provide enough participants to explore differences among students with opposite-, same-, and both-sex sexual partners. Combined data also allowed us to control for age, gender, and whether students reported ever having been forced to have sexual intercourse, one limitation of prior studies examining the links between sexual identity or sexual behavior and risk behaviors among adolescents.[1-3] We focused on behaviors related to violence and harassment, alcohol and other drug use, and unhealthy weight control practices because prior studies of these behaviors have not disaggregated bisexual

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Table 1. Sample Variables by Opposite-, Same-, and Both-Sex Sexual Partners: Vermont and Massachusetts 1995 and 1997 Youth Risk Behavior Surveys*

	Vermont Students				Massachusetts Students			
Variable	Opposite Sex	Same Sex	Both Sexes	Never Had Sex	Opposite Sex	Same Sex	Both Sexes	Never Had Sex
Age, y								
12-13	0.3	1.0	3.4	0.4	0.2	1.0	2.2	0.1
14-15	24.5	30.9	32.2	49.0	22.6	26.7	22.2	45.6
16-17	57.3	51.8	46.0	43.9	55.3	44.1	58.7	44.7
>18	17.9	16.3	18.4	6.7	21.9	28.2	16.9	9.6
Gender								
Female	47.9	28.8	43.5	50.4	47.2	44.0	45.8	52.0
Male	52.1	71.2	56.5	49.6	52.8	56.0	54.2	48.0
Forced to have sex, lifetime	16.7	27.1	46.9	NA	17.4	18.4	60.7	NA
Sexual identity†								
Heterosexual	NA	NA	NA	NA	96.0	81.1	27.2	94.3
Gay or lesbian	NA	NA	NA	NA	0.1	6.5	9.6	0.1
Bisexual	NA	NA	NA	NA	1.3	5.2	43.4	0.9
Not sure/none of the above	NA	NA	NA	NA	2.6	7.2	19.8	4.7

*Opposite sex indicates opposite-sex sexual partners only; same sex, same-sex sexual partners only; both sexes, both male and female sexual partners; and NA, not applicable.

†Sexual identity was measured in Massachusetts only.

youth from gay and lesbian youth. A separate analysis focuses on sexual risk behaviors among males in Masschusetts high schools with opposite-, same-, and both-sex sexual partners.[14] Based on the previous studies that distinguished between gay, lesbian, and bisexual youth, we expected to find that both-sex students would report higher levels of health risk behaviors than would same-sex or opposite-sex students.

RESULTS

SAMPLE CHARACTERISTICS

Vermont's combined sample had 14 623 students; the combined Massachusetts sample had 8141 students. In Vermont, 47.0 % (6873) of the sample reported opposite-sex partners only, 1.7% (249) reported same-sex partners only, 2.3% (336) reported both-sex partners, and 49.0% (7165) reported never having sexual intercourse. In Massachusetts, these prevalences were 48.5% (3948), 1.3% (106), 1.5% (122), and 48.7% (3965), respectively. Age distributions were similar in each state, and sexually experienced students were older than those who were not experienced (**Table 1**). In Vermont, the same-sex group was more than 70% male, but the other 3 groups were relatively evenly divided between male and female respondents. In Massachusetts, all groups were rather evenly divided between male and female respondents. In Vermont, 16.7% of opposite-sex students, 27.1% of same-sex students, and 46.9% of both-sex students reported being forced to have sexual intercourse during their lifetime. In Massachusetts, these prevalences were 17.4%, 18.4%, and 60.7%, respectively.

In Massachusetts, of opposite-sex students, 96.0% identified themselves as heterosexual, as did 81.1% of same-sex students. Among both-sex students, 27.2% identified themselves as heterosexual and 43.4% as bisexual. Finally, among students who had never had sex, 94.3% identified themselves as heterosexual, and 4.7% were not sure or identified with none of the groups.

VIOLENCE, HARASSMENT, AND SUICIDAL BEHAVIORS

The percentages and 95% CIs of sexually experienced youth in Vermont and in Massachusetts engaging in violence and experiencing harassment and suicidal behaviors are listed in **Table 2**. In both states, both-sex students were significantly more likely to report all of these health risk behaviors than were their opposite-sex peers. For example, in Vermont, 8.3% of opposite-sex students compared with 38.6% of both-sex students were threatened or injured with a weapon at school in the 12 months preceding the YRBS. In Massachusetts, these prevalences were 9.1% and 45.3%, respectively. In Vermont, 4.5% of opposite-sex students reported a suicide attempt requiring medical attention in the 12 months preceding the YRBS compared with 26.8% of both-sex students. In Massachusetts the prevalences were 4.5% and 31.6%, respectively. There was only 1 significant difference between same- and opposite-sex students, with same-sex students in Vermont more likely to have been threatened or injured with a weapon at school than opposite-sex students (13.4% vs 8.3%, respectively).

To assess the strength of the association between opposite-, same-, and both-sex sexual partners and violence, harassment, and suicidal behaviors, we conducted logistic regressions controlling for age, gender, and whether respondents had ever been forced to have sexual intercourse (**Table 3**). In both states, both-sex students had significantly greater odds of engaging in all of these behaviors than their opposite-sex peers. Odds ratios in Vermont and Massachusetts ranged from 1.82 (95% CI, 1.41-2.36) and 1.63 (95% CI, 1.01-2.64) for being in a physical

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Table 2. Percentage of Sexually Experienced Students Engaging in Selected Risk Behaviors by Opposite-, Same-, and Both-Sex Sexual Partners: Vermont and Massachusetts, 1995 and 1997 Youth Risk Behavior Survey*

	Vermont Students						Massachusetts Students					
	Opposite Sex (n=6873)		Same Sex (n=249)		Both Sexes (n=336)		Opposite Sex (n=3948)		Same Sex (n=106)		Both Sexes (n=122)	
Risk Behavior	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Violence and harassment												
Carried a weapon†	25.1	(± 1.6)	23.5	(± 6.5)	**48.2**	(± 8.2)	26.1	(± 2.1)	33.7	(± 10.2)	**48.9**	(± 12.6)
Felt unsafe at school†	4.9	(± 0.8)	7.6	(± 3.8)	**22.8**	(± 8.3)	5.8	(± 1.1)	9.0	(± 5.8)	**28.7**	(± 9.6)
Threatened or injured with a weapon at school‡	8.3	(± 0.7)	**13.4**	(± 3.3)	**38.6**	(± 7.0)	9.1	(± 1.1)	13.4	(± 7.0)	**45.3**	(± 11.2)
Property stolen or damaged at school‡	34.8	(± 2.1)	40.8	(± 6.5)	**60.2**	(± 6.1)	29.3	(± 2.0)	37.5	(± 10.6)	**60.0**	(± 9.9)
In a physical fight‡	39.6	(± 2.0)	38.4	(± 6.6)	**60.4**	(± 6.2)	46.9	(± 1.9)	42.2	(± 11.8)	**64.2**	(± 9.6)
Attempted suicide‡	11.9	(± 1.1)	16.5	(± 4.4)	**43.5**	(± 5.7)	12.4	(± 1.1)	18.5	(± 9.3)	**52.2**	(± 11.1)
Made suicide attempt requiring medical attention‡	4.5	(± 0.7)	5.6	(± 2.8)	**26.8**	(± 7.8)	4.5	(± 0.6)	7.8	(± 6.7)	**31.6**	(± 9.9)
Substance use												
Binge drinking†	52.5	(± 2.7)	51.1	(± 7.4)	**61.2**	(± 5.5)	46.9	(± 2.0)	44.3	(± 11.7)	58.7	(± 10.8)
Marijuana use†	49.7	(± 2.3)	52.6	(± 7.2)	**69.1**	(± 4.8)	46.4	(± 2.6)	52.3	(± 10.9)	**67.8**	(± 10.7)
Cocaine use§	14.3	(± 1.6)	**23.2**	(± 6.1)	**47.2**	(± 6.0)	11.6	(± 1.5)	17.7	(± 8.2)	**44.1**	(± 9.5)
Unhealthy weight control												
Vomit or use laxatives to control weight†	7.1	(± 0.6)	**12.3**	(± 3.6)	**25.6**	(± 5.7)	7.0	(± 1.0)	15.3	(± 8.6)	**37.4**	(± 12.1)

*Opposite-sex indicates opposite-sex sexual partners only; same-sex, same-sex partners only; both-sex, both male and female sexual partners; and CI, confidence interval. Boldfaced values indicated nonoverlapping CIs with the opposite sex.

†The specific risk behavior was engaged in on 1 or more of the 30 days preceding the survey.

‡The specific risk behavior was engaged in 1 or more times during the 12 months preceding the survey.

§Students who ever tried any form of cocaine, including powder, "crack," or "freebase."

fight during the 12 months preceding the YRBS, to 5.01 (95% CI, 3.58-7.01) and 5.36 (95% CI, 3.22-8.91) for being threatened or injured with a weapon at school. In Vermont, same-sex students were significantly less likely than their opposite-sex peers to carry a weapon in the 30 days preceding the survey (OR, 0.54; 95% CI, 0.33-0.90) and to have been in a physical fight (OR, 0.62; 95% CI, 0.42-0.90).

ALCOHOL AND OTHER DRUG USE

Both-sex students in Vermont were significantly more likely than opposite-sex students to binge drink and to use other drugs (Table 2). In contrast, Massachusetts both-sex students were as likely as their opposite-sex peers to report binge drinking (≥5 drinks on 1 occasion) in the 30 days preceding the YRBS but were significantly more likely to use marijuana in the 30 days preceding the survey and to ever use cocaine. In Vermont 14.3% of opposite-sex youth had used cocaine compared with 47.2% of both-sex students. In Massachusetts, the prevalence was 11.6% and 44.1%, respectively. In both states, same-sex students were as likely as opposite-sex students to binge drink and to use marijuana. In Massachusetts, the prevalence of cocaine use did not differ between same- and opposite-sex students but was significantly higher for same-sex students in Vermont (23.2% vs 14.3%, respectively).

In logistic regression analyses, both-sex students in Vermont were significantly more likely than their opposite-sex peers to binge drink (OR, 1.36; 95% CI, 1.09-1.68), but no such difference was seen in Massachusetts (Table 3). In both states, both-sex students had greater than twice the odds of their opposite-sex peers of using marijuana. Both-sex students in Vermont had over 4 times the odds of their opposite-sex peers of using cocaine (OR, 4.43; 95% CI, 3.34-5.88) and over 3 times the odds in Massachusetts (OR, 3.86; 95% CI, 2.56-5.83). Same-sex students in Vermont were as likely as their opposite-sex peers to use cocaine but in Massachusetts were significantly more likely to use cocaine.

UNHEALTHY WEIGHT CONTROL PRACTICES

In both states, both-sex students were significantly more likely than opposite-sex students to engage in unhealthy weight control practices, defined as vomiting and using laxatives to lose weight or to keep from gaining weight in the 30 days preceding the YRBS (Table 2). In Vermont, 25.6% of same-sex students compared with 7.1% of opposite-sex students engaged in unhealthy weight control practices. In Massachusetts, the prevalences were 37.4% and 7.0%, respectively. Same-sex students in Vermont were significantly more likely to engage in unhealthy weight control practices than were opposite-sex students (12.3% vs 7.1%, respectively), but no significant difference was seen in Massachusetts.

In a logistic regression analysis (Table 3), both-sex students were significantly more likely than their opposite-sex peers to engage in unhealthy weight control practices in both Vermont (OR, 3.46; 95% CI, 2.35-5.08), and Massachusetts (OR, 5.87; 95% CI, 3.37-10.20). Same-sex students in Vermont were more than twice as likely

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Table 3. Logistic Regressions for Opposite-, Same-, and Both-Sex Sexual Partner on Selected Health Risk Behaviors Among Sexually Experienced Adolescents in Vermont and Massachusetts: 1995 and 1997 Youth Risk Behavior Surveys*

	Vermont Students				Massachusetts Students			
Outcome Behavior†	β	*P* Value	OR	95% CI	β	*P* Value	OR	95% CI
Violence and harassment								
Carried a weapon‡								
Same sex	−0.61	.02	**0.54**	0.33-0.90	0.22	.53	1.24	0.62-2.47
Both sex	0.88	.001	**2.41**	1.50-3.89	0.74	.01	**2.10**	1.18-3.71
Felt unsafe at school‡								
Same sex	0.06	.85	1.06	0.57-1.96	0.46	.27	1.58	0.69-3.61
Both sex	1.21	<.001	**3.36**	1.97-5.74	1.29	<.001	**3.62**	2.09-6.28
Threatened or injured with a weapon at school§								
Same sex	−0.07	.61	0.93	0.70-1.23	0.33	.44	1.40	0.59-3.29
Both sex	1.61	<.001	**5.01**	3.58-7.01	1.68	<.001	**5.36**	3.22-8.91
Property stolen or damaged at school§								
Same sex	0.13	.38	1.14	0.85-1.52	0.44	.07	1.56	0.97-2.51
Both sex	0.90	<.001	**2.46**	1.90-3.20	1.01	<.001	**2.75**	1.76-4.30
In a physical fight§								
Same sex	−0.48	.02	**0.62**	0.42-0.90	−0.26	.39	0.77	0.42-1.40
Both sex	0.60	<.001	**1.82**	1.41-2.36	0.49	.046	**1.63**	1.01-2.64
Attempted suicide§								
Same sex	0.21	.16	1.23	0.91-1.65	0.34	.33	1.41	0.70-2.83
Both sex	1.40	<.001	**4.04**	2.93-5.58	1.59	<.001	**4.91**	2.79-8.66
Made suicide attempt requiring medical attention§								
Same sex	0.01	.98	1.01	0.60-1.69	0.75	.15	2.12	0.75-6.00
Both sex	1.58	<.001	**4.84**	2.95-7.96	1.62	<.001	**5.06**	2.74-9.34
Substance use								
Binge drinking‡								
Same sex	−0.20	.22	0.82	0.59-1.14	−0.04	.87	0.96	0.56-1.63
Both sex	0.31	.008	**1.36**	1.09-1.68	0.35	.19	1.41	0.84-2.38
Marijuana use‡								
Same sex	−0.06	.70	0.94	0.69-1.29	0.22	.34	1.25	0.79-1.97
Both sex	0.74	<.001	**2.10**	1.59-2.76	0.79	.005	**2.21**	1.29-3.79
Outcome behavior								
Cocaine use‖								
Same sex	0.19	.41	1.21	0.76-1.92	0.59	.04	**1.81**	1.02-3.21
Both sex	1.49	<.001	**4.43**	3.34-5.88	1.35	<.001	**3.86**	2.56-5.83
Unhealthy weight control								
Vomit or use laxatives to control weight‡								
Same sex	0.74	.001	**2.09**	1.40-3.12	0.64	.09	1.90	0.90-4.01
Both sex	1.24	<.001	**3.46**	2.35-5.08	1.77	<.001	**5.87**	3.37-10.20

*OR indicates odds ratio; CI, confidence interval; boldfaced values, odds ratios statistically significant at 0.05 or less; same sex, same-sex sexual partners only; both sex, both male and female sexual partners.

†Models for each outcome behavior were controlled for age, gender, and if the respondent had ever had forced sex. Same- and both-sex responses were compared with opposite-sex (referent) responses.

‡The specific outcome behavior was engaged in on 1 or more of the 30 days preceding the survey.

§The specific outcome behavior was engaged in 1 or more times during the 12 months preceding the survey.

‖Students who ever tried any form of cocaine, including powder, "crack," or "freebase."

as their opposite-sex peers to engage in unhealthy weight control practices, but there was no significant difference in Massachusetts.

MULTIPLE RISK BEHAVIORS

In multiple regression analyses that used the number of health risk behaviors as the dependent variable (data not shown), Vermont and Massachusetts both-sex students engaged in significantly more health risk behaviors than opposite-sex students ($\beta = 1.83$, $P = <.001$; $\beta = 2.15$, $P < .001$). In both states, same-sex students did not differ from opposite-sex students.

COMMENT

In this analysis of Vermont and Massachusetts high school students, we found that both-sex students must be considered at high risk for violence, harassment, suicidal behavior, marijuana and cocaine use, and unhealthy weight control practices. In both states, these students had odds 3 to 6 times greater than opposite-sex students of being threatened or injured with a weapon at school, making a suicide attempt requiring medical attention, using cocaine, or vomiting or using laxatives to control their weight. Our findings raise serious public health concerns as they mean that these youth bear increased risk of injury, disease, and death.

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In both Vermont and Massachusetts, both-sex students reported high rates of forced sexual intercourse. We also found that forced sexual intercourse independently predicted all health risk behaviors in both states except for binge drinking in Vermont. Across all health risk behaviors, odds ratios for forced sexual intercourse ranged from 1.29 to 3.74 in Vermont and from 1.32 to 3.59 in Massachusetts. The high rate of forced sexual intercourse among both-sex youth likely contributes to their heightened levels of risk behaviors.

These findings of greater risk among both-sex students are consistent with the few reports that have compared bisexual- and gay- or lesbian-identified youth and found more frequent health risk behaviors among bisexuals. For example, Hershberger et al[13] reported that bisexual-identified adolescents were 5 times more likely to attempt suicide than their gay and lesbian peers. Research should continue that can replicate these findings, especially using large, population-based samples like the ones in this analysis. Researchers should differentiate subgroups of sexual minorities, as the present study suggests that combining gay, lesbian, and bisexual students obscures important differences in their health risk behaviors.

We found that same-sex students were not significantly more at risk for most health risk behaviors than were opposite-sex students. Furthermore, we found that Vermont same-sex youth were significantly less likely than their opposite-sex peers to carry a weapon or to be in a physical fight. However, Vermont same-sex youth were significantly more likely than opposite-sex youth to vomit or use laxatives to control their weight, and Massachusetts same-sex youth were more likely to use cocaine.

One possible explanation for the significantly greater risk behavior among both-sex students than among same-sex students is that the latter were much less likely to identify themselves as being in a sexual minority. In Massachusetts, 73% of the both-sex students identified as gay, lesbian, bisexual, or as unsure of their identities, but more than 80% of same-sex students identified themselves as heterosexual. Thus, a much greater proportion of both-sex students have adopted an identity that reflects their same-sex sexual behavior than have same-sex students. There is no clear match between sexual behaviors and sexual identities reported by students in Massachusetts.

Possibly, same-sex students reported a heterosexual identity because that was socially desirable. Alternatively, same-sex students may not yet have adopted identities consistent with their behaviors, or the same-sex behavior they reported was anomalous and not salient to their identity development. Because same-sex students in Massachusetts mostly identified as heterosexual and may have been perceived as heterosexual by their peers, they may not have experienced the stressors of sexual prejudice, victimization, and social marginalization associated with increased health risk behaviors.[6,19,20] We might expect that a higher level of stressors associated with sexual minority status would lead to engagement in more health risk behaviors, but no studies to date have demonstrated a causal relationship between stress related to sexual minority status and health risk behaviors. It is likely that some amount of the heightened risk found among gay, lesbian, and bisexual youth compared with their heterosexual peers in prior studies is accounted for by students who have sex with both males and females, and among those who are bisexual-identified.

Researchers should examine disparities between sexual behaviors and sexual identities in youth, and the associations of sexual behaviors and identities with health risk behaviors. To date, researchers have studied sexual behavior, identity, or orientation as isolated constructs when they analyze health risk behaviors among sexual minority adolescents. Instead, researchers should measure all 3 of these constructs and examine their interactions to determine the implications of using these different measures. We would also expect these health risk behaviors to vary by the gender of students within all of the constructs, and researchers should explore the interaction of gender with them. In addition, qualitative and longitudinal research should examine the context and understandings of sexuality and sexual behavior among youth and the role that peer, parental perceptions, and broader social norms play in developing sexual identity and behavior.

Another explanation for these findings is that both-sex sexual behavior may be part of a larger cluster of interrelated risk behaviors in which a small group of highly at-risk students is engaged. Not only are both-sex students more likely than opposite-sex students to engage in individual risk behaviors, they also engage in a greater number of them. As Jessor[21] suggests, multiple risk behaviors among adolescents are related to complex sets of risk and protective determinants ranging from biological to social factors. Understanding determinants that might underlie both-sex sexual behavior and health risk behaviors requires careful investigation of a wide range of risk and protective factors.

This study has several important limitations. First, some questions were worded differently within and across sites. For example, in 1995, the Vermont YRBS measured forced sex by asking: "Have you ever been forced or pressured to have sexual intercourse against your will?" but in 1997, it asked: "Have you ever been forced or pressured to have sexual intercourse?" In both of its surveys, Massachusetts measured forced sex by asking: "During your life, has anyone ever had sexual contact with you against your will?" Furthermore, as described earlier, the 1995 and 1997 Vermont YRBS asked about whether students had opposite-, same-, or both-sex partners in slightly different ways, questions that were worded differently than on the Massachusetts YRBS. If these differently worded questions were measuring significantly different subpopulations or behaviors, we would expect to see weak and diffuse findings. On the contrary, the pattern of results was strong and consistent across the 2 sites.

A second limitation is that measures were self-reported, and underreporting or overreporting may have occurred, especially for sensitive questions such as whether students had opposite-, same-, or both-sex sexual partners and sexual identity. Although the reliability of many YRBS questions has been studied, the validity and reliability of questions on whether students had opposite-, same-, or both-sex sexual partners and sexual identity have not.

A third limitation is that the YRBS is cross-sectional, and, therefore, the nature of the relationship between opposite-, same-, and both-sex sexual partners and health risk behaviors cannot be determined, nor can

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the development of sexual behaviors and identities be measured over time.

A fourth limitation is that the number of same-sex students in both states' samples is small and the lack of difference between those students' and opposite-sex students' health risk behaviors may reflect low statistical power rather than true similarity in risk behaviors. However, the number of both-sex students is also small, and unlike same-sex students, the findings for both-sex students are consistently different from opposite-sex students. This suggests that the findings for same-sex students are at least partially reflective of behavior and not simply an artifact of statistical power. A power analysis demonstrated that the sample sizes were sufficiently large to detect differences among the groups at a power of 80%. A final limitation is that although the data were representative of students in Vermont and Massachusetts, the results cannot be generalized to all youth in the 2 states, or to students throughout the United States.

CONCLUSIONS

The findings of this study can help public health agencies, school personnel, health educators, and health service providers to understand and target youth in sexual minorities who are at highest risk for multiple risk behaviors. Increased understanding of the health needs of these youth is critical to the goal of eliminating health disparities in the United States by sexual orientation, as stated in *Healthy People 2010*.[22] School- and community-based interventions should be designed to help prevent and reduce risks among adolescents who have sex with both male and female partners. Such interventions should be comprehensive and address multiple health issues, including forced sex, sexual risk behaviors, violence, harassment, suicidal behavior, alcohol and other drug use, and unhealthy weight control practices. Sexual minority youth should receive timely interventions that are sensitive to the cultural contexts of gay, lesbian, and bisexual communities, that address the development of healthy sexual identities, and that assist youth in navigating the process and consequences of disclosing their sexual identities to adults and peers. In addition, health professionals should anticipate that gay, lesbian, and bisexual youth may have both male and female sexual partners and should provide relevant reproductive health information accordingly. Service strategies for these youth should be comprehensive and may need to involve physical and mental health, legal, and housing services and to provide youth with the skills to make healthy decisions and to engage in positive relationships with their sexual partners, peers, parents, and other adults.

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What This Study Adds

Sexual minority youth (ie, gay, lesbian, bisexual, or questioning youth) face a disproportionate number of health risks compared with their heterosexual peers. Only a few studies have disaggregated bisexual from gay and lesbian youth. Those that did found that bisexuality was associated with significantly more troubles in school, and a greater likelihood of making a suicide attempt.

To our knowledge, this is the first population-based study to differentiate between high school students who have experience only with opposite-sex students, only with same-sex students, and with both male and female both-sex students to compare the prevalence of a variety of health risk behaviors. Both-sex students were significantly more at risk for violence, harassment, suicidality, alcohol and other drug use, and unhealthy weight control than opposite-sex students. Same-sex students were as likely to engage in most of these risk behaviors as opposite-sex students. School- and community-based interventions should be designed to help prevent and reduce health risks among adolescents who have sex with both male and female partners.

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