

Sexual Orientation and Risk of Pregnancy Among New York City High-School Students

Lisa L. Lindley, DrPH, MPH, CHES, and Katrina M. Walsemann, PhD, MPH

Over the past 2 decades, significant research and programmatic attention has been directed toward understanding and preventing adolescent pregnancy in the United States. As a result, the US adolescent pregnancy, birth, and abortion rates have reached historic lows, with significant downward trends reported among adolescents of all racial/ethnic and age groups.¹ In New York City, the adolescent pregnancy rate fell by 30% in just 1 decade (2001–2011).² Despite these significant improvements, rates of unplanned adolescent pregnancy in the United States have remained largely unchanged³ and US adolescent pregnancy and birth rates remain the highest among all developed countries.⁴ Moreover, although much adolescent pregnancy prevention research has been conducted over the past 2 decades, notably few studies have explored the risk of pregnancy among sexual-minority (nonheterosexual) adolescents.

Among the studies that have explored the association between sexual orientation and adolescent pregnancy risk, adolescents who identified as lesbian, gay, and bisexual (LGB) have had either the same or a significantly (2–7 times) increased likelihood of experiencing a pregnancy compared with their heterosexual peers, despite being as likely to have engaged in vaginal intercourse.^{5–10} Furthermore, LGB youths are more likely than heterosexual youths to have had their first heterosexual intercourse before age 14 years, to have had more sexual partners, and to have experienced sexual abuse^{5–10}—all factors associated with an increased risk of adolescent pregnancy.¹¹ Bisexual-identified youths in particular report engaging in riskier sexual behaviors at younger ages than their peers.^{8–10} Moreover, having sexual partners of the same gender or both genders during the past year was a common occurrence among adolescent parents, especially fathers.⁸

Despite the valuable contributions of the aforementioned research, there are some limitations to their applicability today. First, most

Objectives. We examined associations between sexual orientation and pregnancy risk among sexually experienced New York City high-school students.

Methods. We analyzed data from 2005, 2007, and 2009 New York City Youth Risk Behavior Surveys. We excluded students who had never engaged in sexual intercourse, only had same-gender sexual partners, or had missing data on variables of interest, resulting in a final sample of 4892 female and 4811 male students. We employed multivariable logistic regression to examine pregnancy risk by sexual orientation, measured as self-reported sexual identity and gender of sexual partners, with adjustment for demographics and sexual behaviors. We stratified analyses by gender.

Results. Overall, 14.3% of female and 10.8% of male students had experienced a pregnancy. Students who identified as gay, lesbian, or bisexual or reported both male and female sexual partners had higher odds of pregnancy than heterosexual students or students who only had opposite-gender sexual partners. Sexual behaviors accounted for higher odds of pregnancy among female, but only partially accounted for higher odds of pregnancy involvement among male, sexual-minority students.

Conclusions. Sexual orientation should be considered in future adolescent pregnancy-prevention efforts, including the design of pregnancy-prevention interventions. (*Am J Public Health.* 2015;105:1379–1386. doi: 10.2105/AJPH.2015.302553)

of these studies analyzed data from the 1980s and early 1990s, before or during the early stages of adolescent pregnancy reductions.^{5–8} Second, most of these studies examined adolescent pregnancy risk among girls only^{6,9,10} (1 study combined male and female LGB students in its sample)⁷ and among predominately White populations,^{6,7,9} and others explored pregnancy risk beyond adolescence into young adulthood (ages 15–20 years).¹⁰ One study of British Columbia students in grades 7 through 12 found that adolescent pregnancy rates declined among all sexual orientation groups between 1992 and 2003, but the trends in pregnancy and related risk behaviors were less consistent for sexual-minority adolescents than for their heterosexual counterparts.⁸ Thus, to understand the current state of adolescent pregnancy among sexual-minority students, we need more recent data on the risk of adolescent pregnancy across sexual orientation for male and female students, particularly among racially diverse student populations.

Furthermore, most of the previous research that explored pregnancy risk among sexual-minority students used either self-reported sexual identity¹⁰ (i.e., students identified themselves as heterosexual, gay or lesbian, bisexual, or unsure) or sexual attraction^{5,6,8} (i.e., students reported their feelings of attraction as 100% heterosexual to 100% homosexual, or “not sure”) as the sole measure of sexual orientation; 2 studies combined LGB self-identity and same-sex behavior into a single measure of sexual orientation.^{7,9} Few studies have employed more than 1 measure of sexual orientation to assess pregnancy risk. This is potentially problematic, as single-indicator measures do not sufficiently capture the complexities of sexual orientation.¹² Increasingly, young people use different labels (such as queer, pansexual, or asexual) or use no label at all when referring to their sexual identity.^{13–15} Moreover, fear of discovery, stigma, or cultural values surrounding sexual orientation may lead some young people to report a sexual identity that is not in accordance with their

sexual behavior or underlying sexual attraction.^{16–18} Thus, to obtain a more comprehensive understanding of pregnancy risk among sexual minority students, it is important to simultaneously examine multiple dimensions of sexual orientation (i.e., sexual identity, attraction, and behavior).^{12,17,18}

Our study addresses these limitations by using New York City's 2005, 2007, and 2009 Youth Risk Behavior Surveillance System (YRBSS) data. We examined the risk of adolescent pregnancy by sexual orientation by using 2 indicators of sexual orientation—students' self-reported sexual identity and gender of students' sexual partners. We hypothesized that (1) sexual-minority students would be more likely to experience an adolescent pregnancy than heterosexual students, (2) this relationship would be found for both female and male students, and (3) sexual risk behaviors would explain the higher risk of adolescent pregnancy among sexual-minority students.

METHODS

Conducted every 2 years, the Centers for Disease Control and Prevention's YRBSS monitors priority health risk behaviors, including sexual behaviors that contribute to unintended pregnancy, among representative samples of 9th- through 12th-grade students.¹⁹ Most states (48) and more than 20 large urban school districts participate in the YRBSS¹⁹; however, only 8 sites—5 states (Delaware, Maine, Massachusetts, Rhode Island, and Vermont) and 3 large urban school districts (Boston, MA; Chicago, IL; and New York City, NY)—included questions about students' sexual identity and gender of sexual partners.²⁰ Of these 8 sites, only 4 (2 cities and 2 states) asked whether students had “ever been pregnant or gotten someone pregnant.”²⁰ New York City had the largest and most racially diverse sample of these 4 remaining sites. To eliminate possible confounding because of regional, city, or district-level variability, we selected the New York City school district for our study.

Sample

We used data from the 2005, 2007, and 2009 New York City YRBSS. The New York City YRBSS employs a stratified, 2-stage probability sample designed to produce a representative

sample of New York City students attending grades 9 through 12 in each survey year.²¹ In the first sampling stage, schools were randomly selected proportional to school enrollment.²¹ In the second stage, classrooms meeting during a selected time period or covering a required subject were randomly selected and all students within that classroom were asked to complete a self-administered YRBSS questionnaire.²¹ Students who did not want to participate were allowed to opt out.

Since 2005, schools served by the Department of Health and Mental Hygiene's District Public Health Offices located in 3 high-risk neighborhoods (i.e., South Bronx, East and Central Harlem, and North and Central Brooklyn) were oversampled to ensure that these subareas were represented in the sample.²¹ In 2009, the New York City YRBSS also included an oversample of schools served by School-Based Health Centers, which provide onsite primary care to students in the 5 boroughs of New York City.^{21,22} Schools were selected for citywide and borough-level representation.²¹ Overall response rates, which were averaged across school and student response rates, ranged from 68% in 2005 and 2007 to 79% in 2009.²¹

In 2005, 8140 New York City students completed the YRBSS questionnaire.²¹ Sample sizes in 2007 and 2009 were 9080 and 11 887, respectively.²¹ We restricted our sample to students who reported having had vaginal intercourse ($n=10\ 827$; 5278 female and 5549 male students). Finally, we excluded students who had missing data on any of the variables included in our analyses, resulting in a final sample size of 4892 female and 4811 male students.

Measures

Students were asked how many times they had ever been pregnant or gotten someone pregnant (dependent variable). Students who responded that they had been pregnant or had gotten someone pregnant (i.e., pregnancy involvement) 1 or more times were coded 1; otherwise they were coded 0.

We measured sexual orientation with 2 items—gender of sexual partners and sexual identity. Students were asked, “During your life, with whom have you had sexual contact?” For female students, gender of sexual partners was categorized as male partners only or male

and female partners. For male students, gender of sexual partners was categorized as female partners only or male and female partners. Students were asked, “Which of the following best describes you? Heterosexual (straight), gay or lesbian, bisexual, or unsure.” We categorized sexual identity as (1) heterosexual; (2) gay, lesbian, or bisexual; or (3) unsure. We collapsed gay or lesbian with bisexual because the risk profiles for both groups were similar and because there were issues of data sparseness ($n < 10$ in key cells).

To examine the extent to which differences in sexual behaviors explain the association between sexual orientation and pregnancy, we included a number of indicators of sexual behaviors in our models. Age at first intercourse was measured as aged 13 years or younger, 14 or 15 years, and 16 years or older. We measured the number of sexual partners the students reported in their lifetime as 1 partner, 2 or 3 partners, 4 or 5 partners, or 6 or more partners. Respondents also reported if they had ever been physically forced to have sexual intercourse.

We categorized race/ethnicity as non-Hispanic White, non-Hispanic Black, Hispanic (any race), Asian/Pacific Islander, or other race. We included age of respondent as a continuous variable ranging from 12 to 18 years (the age variable was bottom coded at 12 and top coded at 18). We categorized survey year as 2005, 2007, or 2009.

Data Analysis

We stratified all analyses by gender, as the relationship between sexual orientation, sexual behaviors, and pregnancy may differ for girls and boys.^{5,8} We began with descriptive statistics. Next, we examined bivariate associations between sexual identity and the covariates and dependent variable, as well as between gender of sexual partners and the covariates and dependent variable. We employed multivariable logistic regression to examine the association between sexual orientation, measured as sexual identity and gender of sexual partners, and risk of pregnancy, adjusting for demographics and sexual behaviors. We weighted all analyses to adjust for the New York City YRBSS's sampling design and unit nonresponse by using the SVY command in Stata version 13 (StataCorp LP, College Station, TX).

Because of modest correlations between sexual identity and gender of sexual partners ($r=0.56$, female students; $r=0.61$, male students), we examined the data for possible multicollinearity. We found no indication of multicollinearity; none of the variables in the final model had variance inflation factors larger than 4.07 or tolerances smaller than 0.25. Furthermore, gender of sexual partners and sexual identity had variance inflation factors no larger than 2.5 and tolerances no smaller than 0.40. Generally, a cutpoint of 10 (variance

inflation factor) and 0.10 (tolerance) are used to indicate multicollinearity.²³

RESULTS

The dependent variable in this study was pregnancy; approximately 14% of female students reported that they had ever been pregnant (Table 1). More than 85% of female students identified as heterosexual and almost 90% had only had male sexual partners. Female students were primarily Black (43%)

with a mean age of 16.0 years. Most were 14 or 15 years old when they first had sexual intercourse (53%); 40.9% had only had 1 sexual partner and 17.2% reported ever having been physically forced to have sexual intercourse.

Approximately 11% of male students reported that they had gotten someone pregnant. Most male students identified as heterosexual (96%) and had only had female sexual partners (97%). Male students were primarily Hispanic (41.2%) with a mean age of 15.9 years. More than 50% were younger than 13 years when they first had sexual intercourse; 23.7% had only had 1 sexual partner and 6.9% reported ever having been physically forced to have sexual intercourse. Additional details on the sample characteristics are provided in Table 1.

Bivariate Associations

Table 2 presents bivariate associations between sexual orientation and our dependent variable and covariates by gender. Among female students, sexual identity and gender of sexual partners were significantly associated with pregnancy; 22.6% of lesbian or bisexual female students and 20.1% of female students who had had both male and female sexual partners reported ever having been pregnant compared with 13.3% of heterosexual female students and 13.7% of female students who reported having had only male sexual partners. Female students who had had male and female sexual partners were younger at first sexual intercourse and were more likely to report having been physically forced to have sexual intercourse than female students with only male sexual partners. We also found similar patterns by sexual identity.

Among male students, sexual identity and gender of sexual partners were significantly associated with pregnancy involvement risk; 28.6% of gay or bisexual male students and 37.7% of male students who had had sexual intercourse with male and female partners had ever gotten someone pregnant compared with 10% of heterosexual male students and 9.9% of male students with only female sexual partners. Male students who had had male and female sexual partners were younger at first sexual intercourse, had more lifetime sexual partners, and more than 30% reported having

TABLE 1—Weighted Sample Characteristics of Sexually Experienced Female and Male Students by Sexual Identity and Gender of Sexual Partners, Youth Risk Behavior Surveillance System, 2005–2009, New York City

Characteristics	Female Students (n = 4892)	Male Students (n = 4811)
Ever pregnant or ever gotten someone pregnant, %	14.3	10.8
Sexual identity, %		
Heterosexual	85.9	96.0
Gay, lesbian, or bisexual	11.2	2.2
Unsure	2.9	1.8
Gender of sexual partners, %		
Male partners only	89.6	NA
Female partners only	NA	97.0
Male and female partners	10.4	3.0
Race/ethnicity, %		
Non-Hispanic White	9.3	10.0
Non-Hispanic Black	43.0	40.5
Hispanic (any race)	39.9	41.2
Asian/Pacific Islander	5.4	6.0
Other	2.3	2.3
Age, y, mean	16.0	15.9
Survey year, %		
2005	41.2	42.9
2007	34.6	35.9
2009	24.2	21.2
Age at first sexual intercourse, y, %		
≤ 13	24.4	51.0
14–15	53.0	37.8
≥ 16	22.6	11.2
No. of sexual partners, %		
1	40.9	23.7
2–3	34.7	31.1
4–5	13.8	16.1
≥ 6	10.6	29.0
Ever forced to have sexual intercourse, %	17.2	6.9

Note. NA = not applicable; sexually experienced = ever engaged in vaginal intercourse.

TABLE 2—Weighted Bivariate Associations Between Sample Characteristics of Sexually Experienced Female and Male Students by Sexual Identity and Gender of Sexual Partners: Youth Risk Behavior Surveillance System, 2005–2009, New York City

Characteristics	Gender of Sexual Partners		Sexual Identity		
	Opposite Gender Only	Both Genders	Heterosexual	Gay, Lesbian, or Bisexual	Unsure
Female students (n = 4892)					
Ever pregnant, ^{a,b,c} %	13.7	20.1	13.3	22.6	12.2
Sexual identity, ^{a,b} %					
Heterosexual	93.0	24.7	...	...	...
Lesbian or bisexual	4.7	67.6	...	...	...
Unsure	2.3	7.7	...	...	...
Gender of sexual partners, ^{a,c} %					
Opposite gender only	...	...	97.0	37.3	72.2
Both genders	...	...	3.0	62.7	27.8
Race/ethnicity, ^{a,b,c} %					
Non-Hispanic White	9.0	12.0	9.4	8.5	11.5
Non-Hispanic Black	44.1	33.5	43.8	37.3	40.8
Hispanic (any race)	39.5	43.3	38.8	48.9	39.0
Asian/Pacific Islander	5.7	3.5	6.0	1.7	4.2
Other	1.7	7.7	2.1	3.6	4.5
Age, ^d y, mean	16.0	15.9	16.1	15.9	16.0
Age at first sexual intercourse, ^{a,b,c} y, %					
≤ 13	22.3	42.9	21.9	41.8	31.4
14–15	53.6	48.0	53.9	46.7	49.7
≥ 16	24.2	9.2	24.2	11.6	18.9
No. of sexual partners, ^{a,b,c} %					
1	43.5	19.0	43.3	24.7	31.2
2–3	34.3	37.5	34.1	39.2	33.9
4–5	13.2	19.3	13.6	14.6	19.4
≥ 6	9.0	24.2	9.0	21.2	15.6
Ever forced to have sexual intercourse, ^{a,b,c} %	15.2	34.4	15.2	29.2	29.0
Male students (n = 4811)					
Ever gotten someone pregnant, ^{a,b,c} %	9.9	37.7	10.0	28.6	32.7
Sexual identity, ^{a,b} %					
Heterosexual	98.5	14.4	...	...	...
Gay or bisexual	0.4	59.6	...	...	...
Unsure	1.1	25.6	...	...	...
Gender of sexual partners, ^c %					
Opposite gender only	...	...	99.6	17.6	57.0
Both genders	...	...	0.4	82.4	43.0

Continued

been physically forced to have sexual intercourse compared with 6.2% of male students with only female partners. Similar patterns were also found by sexual identity.

Multivariable Logistic Regression

We examined the association between sexual orientation and pregnancy risk among female students in Table 3 by using multivariable logistic

regression. Results from models 1 and 2, the least-restrictive models, revealed significantly higher odds of pregnancy for female students who identified as lesbian or bisexual (odds ratio [OR]= 1.90; 95% confidence interval [CI]= 1.25, 2.89) compared with heterosexual female students, as well as for those who had had both male and female partners (OR= 1.58; 95% CI= 1.07, 2.33) compared with those with only male partners. Including both measures of sexual orientation attenuated the association between gender of sexual partner and pregnancy (model 3); however, female students who identified as lesbian or bisexual remained at higher risk for pregnancy (OR= 1.82; 95% CI= 1.13, 2.93).

After we adjusted for demographics (model 4), the odds of pregnancy remained significantly higher among female students who identified as lesbian or bisexual (OR= 1.80; 95% CI= 1.12, 2.87) compared with their heterosexual counterparts. With further adjustment for sexual behaviors, sexual identity was no longer significantly associated with pregnancy (OR= 1.63, 95% CI= 0.94, 2.81; model 5).

Next, we examined the association between sexual orientation and pregnancy involvement risk among male students in Table 4. Results from models 1 and 2 revealed significantly higher odds of pregnancy involvement for male students who identified as gay or bisexual (OR= 3.62; 95% CI= 1.84, 7.14) or who were unsure of their sexual identity (OR= 4.40; 95% CI= 1.89, 10.25) compared with their heterosexual counterparts, as well as for those who had both female and male partners (OR= 5.48; 95% CI= 3.05, 9.85) compared with those with only female partners. Including both measures of sexual orientation attenuated the association between sexual identity and pregnancy, although male students who were unsure of their sexual identity continued to have higher odds of pregnancy involvement (OR= 2.09; 95% CI= 1.07, 4.07) than their heterosexual counterparts (model 3). Male students who had had both male and female sexual partners continued to have higher odds of pregnancy involvement (OR= 4.65; 95% CI= 2.07, 10.45) than those with only female sexual partners.

After adjustment for demographics (model 4), the odds of pregnancy involvement remained

TABLE 2—Continued

Race/ethnicity, ^{a,b,c} %					
Non-Hispanic White	10.0	11.9	10.0	15.7	2.9
Non-Hispanic Black	40.8	31.0	40.9	26.6	34.5
Hispanic (any race)	41.3	38.6	41.2	46.1	36.3
Asian/Pacific Islander	5.7	13.8	5.6	7.2	23.7
Other	2.2	4.7	2.3	4.4	2.6
Age, ^d y, mean	15.9	15.8	15.9	15.9	15.7
Age at first sexual intercourse, ^{a,b,c} y, %					
≤ 13	50.4	69.7	50.3	72.5	59.0
14–15	38.3	22.0	38.4	18.5	32.8
≥ 16	11.3	8.4	11.3	9.0	8.3
No. of sexual partners ^{a,b}					
1	23.9	17.4	24.0	16.5	15.9
2–3	31.5	20.3	31.3	20.3	33.8
4–5	16.2	14.1	16.3	14.9	10.2
≥ 6	28.4	48.2	28.4	48.3	40.1
Ever forced to have sexual intercourse, ^{a,b,c} %	6.2	30.6	6.2	25.2	24.6

Note. Sexually experienced = ever engaged in vaginal intercourse. All variables are categorical and can be interpreted as percentages unless otherwise noted.

^a χ^2 test.

^b $P < .05$; gender of sexual partners.

^c $P < .05$; sexual identity.

^dF-test.

significantly higher among male students who were unsure of their sexual identity (OR = 2.22; 95% CI = 1.15, 4.28) compared with heterosexual male students, as well as among male students who had had both male and female sexual partners (OR = 5.32; 95% CI = 2.31, 12.28) compared with only female partners. Further adjustment for sexual behaviors (model 5) explained about 37% of the odds of pregnancy involvement among male students who were unsure of their sexual orientation (e.g., change in odds between model 4 and model 5),²⁴ and about 23% of the odds of pregnancy involvement among male students who had had male and female sexual partners.

DISCUSSION

As hypothesized, we found that both female and male sexual-minority high-school students in New York City who had ever engaged in vaginal intercourse were at greater risk for pregnancy than their heterosexual counterparts. These results are consistent with previous

research, which primarily focused on adolescent pregnancy risk among female sexual-minority populations.^{6,9,10} Few studies, however, have explored pregnancy risk among sexual-minority male adolescents^{5,8}; our results suggest that adolescent pregnancy may also be a concern for this population. Moreover, our sample is much more racially and ethnically diverse than those in previous investigations, which provides preliminary evidence that adolescent pregnancy has an impact on more than just White sexual-minority populations. Thus, our results suggest that pregnancy-prevention research and intervention development efforts should consider ways to more effectively target male and female sexual-minority adolescents from diverse racial/ethnic backgrounds.

We also found that associations with pregnancy risk manifested differently across gender when we simultaneously estimated 2 measures of sexual orientation—sexual identity and gender of sexual partners. Among female students, identifying as LGB was associated with greater pregnancy risk, but gender of sexual partners

was not, whereas among male students, being “unsure” of their sexual identity and having both female and male sexual partners were associated with greater pregnancy risk. In general, sexual risk behaviors explained, at least in part, the higher odds of pregnancy risk among female and male sexual-minority students.

Earlier age at first sexual intercourse and having a greater number of sexual partners appeared to account for the higher odds of pregnancy risk found among LGB-identified female students. Considering their participation in these sexual behaviors, these results are not surprising; nearly twice as many LGB as heterosexual female students (42% vs 22%, respectively) had their first sexual intercourse at age 13 years or younger and more than twice as many LGB as heterosexual female students (21% vs 9%, respectively) had had 6 or more sexual partners. These results are also consistent with existing literature in which LGB girls are more likely than their heterosexual counterparts to have had their first sexual intercourse before the age of 14 years and to have had more sexual partners.^{5–10} It is important to note, however, that although LGB female students were significantly more likely than heterosexual female students to report ever having been forced to have sexual intercourse (29.2% vs 15.2%, respectively), forced sexual intercourse was not associated with increased pregnancy risk.

Conversely, ever having been forced to have sexual intercourse and having had more sexual partners were associated with increased risk of pregnancy involvement among male sexual-minority students. These 2 behaviors accounted, in part, for the higher odds of pregnancy involvement risk among male students who were “unsure” of their sexual identity. Our results are consistent with previous research in which the odds of pregnancy involvement are greater among adolescent boys and young adult men who had been forced to have sexual intercourse than among their counterparts who had never been forced to have sexual intercourse.^{25–28} Researchers speculate that this is because being assaulted by another man may threaten a male victim’s heterosexual identity, and being assaulted by a woman may threaten his masculinity.^{28,29} As a result, adolescent boys who have been forced to have sexual

TABLE 3—Predicted Odds Ratios of Ever Having Been Pregnant Among Sexually Experienced Female Students, Weighted Logistic Regression: Youth Risk Behavior Surveillance System, 2005–2009, New York City

Variable	Model 1, OR (95% CI)	Model 2, OR (95% CI)	Model 3, OR (95% CI)	Model 4, OR (95% CI)	Model 5, OR (95% CI)
Sexual identity					
Heterosexual (Ref)	1.00		1.00	1.00	1.00
Lesbian or bisexual	1.90 (1.25, 2.89)		1.82 (1.13, 2.93)	1.80 (1.12, 2.87)	1.63 (0.94, 2.81)
Unsure	0.90 (0.49, 1.67)		0.89 (0.47, 1.67)	0.92 (0.51, 1.69)	0.84 (0.94, 2.81)
Gender of sexual partners					
Male partners only (Ref)		1.00	1.00	1.00	1.00
Male and female partners		1.58 (1.07, 2.33)	1.07 (0.70, 1.64)	1.14 (0.74, 1.76)	0.78 (0.48, 1.29)
Race/ethnicity					
Non-Hispanic White (Ref)				1.00	1.00
Non-Hispanic Black				3.61 (1.95, 6.66)	3.07 (1.69, 5.58)
Hispanic (any race)				3.55 (2.01, 6.28)	3.25 (1.86, 5.70)
Asian/Pacific Islander				2.23 (0.97, 5.12)	2.43 (0.99, 5.96)
Other				3.55 (1.50, 8.42)	3.29 (1.36, 7.96)
Age					
				1.23 (1.04, 1.44)	1.36 (1.17, 1.57)
Survey year					
2005				1.18 (0.79, 1.73)	1.10 (0.77, 1.58)
2007				0.91 (0.66, 1.25)	0.96 (0.68, 1.35)
2009 (Ref)				1.00	1.00
Age at first sexual intercourse, y					
≤ 13					4.23 (2.42, 7.37)
14–15					2.66 (1.63, 4.36)
≥ 16 (Ref)					1.00
No. of sexual partners					
1 (Ref)					1.00
2–3					1.62 (1.08, 2.45)
4–5					2.33 (1.50, 3.63)
≥ 6					3.11 (1.94, 4.98)
Ever forced to have sexual intercourse					
					1.04 (0.68, 1.60)

Note. CI = confidence interval; OR = odds ratio. The sample size was $n = 4892$.

intercourse may engage in more sexual risk behaviors, including having a greater number of sexual partners and getting a female partner pregnant, to prove their manhood or prove they are not gay; or they may have sexual intercourse with both female and male partners in an attempt to ascertain their sexual orientation.^{6,8,28,29} It is likely, however, that other factors, such as stigma and discrimination, lack of support resources, and connectedness to family and school, which have been associated with pregnancy risk among LGB students in previous investigations,^{6–8} also contributed to increased pregnancy involvement among male sexual-minority students, but were not assessed in the New York City YRBSS.

Limitations

Several limitations should be noted. First, significant differences in health outcomes and participation in a number of health behaviors, including sexual behaviors associated with adolescent pregnancy, have been reported between gay or lesbian and bisexual youths.^{8–10,30–32} Thus, it is likely that significant differences also exist in pregnancy risk between these populations; however, we were unable to explore this possibility in our sample because of issues of data sparseness. Such data limitations highlight the importance of including sexual orientation measures in large, national studies, as well as in the YRBSS across all participating sites.^{17,18,20}

Second, the New York City YRBSS did not include questions regarding students' sexual attraction. As a result, we could only examine 2 dimensions of sexual orientation in our study. Future research should consider how sexual attraction might be associated with adolescent pregnancy risk, as well as whether or how degree of concordance or discordance across sexual identity, same- or opposite-sex behavior, and sexual attraction is associated with pregnancy risk.^{17,18,33–35}

Finally, our sample is representative of New York City high-school students in 2005, 2007, and 2009 who had engaged in vaginal intercourse; therefore, our findings should not be generalized beyond this population. This is

TABLE 4—Predicted Odds Ratios of Pregnancy Involvement Among Sexually Experienced Male Students, Weighted Logistic Regression: Youth Risk Behavior Surveillance System, 2005–2009, New York City

Variable	Model 1, OR (95% CI)	Model 2, OR (95% CI)	Model 3, OR (95% CI)	Model 4, OR (95% CI)	Model 5, OR (95% CI)
Sexual identity					
Heterosexual (Ref)	1.00		1.00	1.00	1.00
Gay or bisexual	3.62 (1.84, 7.14)		0.96 (0.36, 2.55)	0.86 (0.32, 2.29)	0.55 (0.22, 1.38)
Unsure	4.40 (1.89, 10.25)		2.09 (1.07, 4.07)	2.22 (1.15, 4.28)	1.65 (0.87, 3.14)
Gender of sexual partners					
Female partners only (Ref)		1.00	1.00	1.00	1.00
Female and male partners		5.48 (3.05, 9.85)	4.65 (2.07, 10.45)	5.32 (2.31, 12.28)	4.42 (1.89, 10.32)
Race/ethnicity					
Non-Hispanic White (Ref)				1.00	1.00
Non-Hispanic Black				0.69 (0.38, 1.27)	0.52 (0.30, 0.89)
Hispanic (any race)				1.15 (0.63, 2.10)	1.04 (0.64, 1.69)
Asian/Pacific Islander				0.79 (0.44, 1.45)	1.04 (0.59, 1.83)
Other				0.25 (0.08, 0.73)	0.18 (0.06, 0.51)
Age					
				1.13 (0.97, 1.31)	1.15 (0.99, 1.33)
Survey year					
2005				0.69 (0.47, 1.01)	0.68 (0.47, 0.98)
2007				0.66 (0.49, 0.88)	0.66 (0.48, 0.92)
2009 (Ref)				1.00	1.00
Age at first sexual intercourse, y					
≤ 13					2.09 (0.97, 4.52)
14–15					1.57 (0.80, 3.05)
≥ 16 (Ref)					1.00
No. of sexual partners					
1 (Ref)					1.00
2–3					2.19 (1.07, 4.50)
4–5					3.24 (1.53, 6.88)
≥ 6					6.24 (3.37, 11.54)
Ever forced to have sexual intercourse					
					3.40 (2.20, 5.24)

Note. CI = confidence interval; OR = odds ratio. The sample size was n = 4811.

particularly important to note because New York City, unlike many other large urban school districts, allows all minor students to have access to contraceptive services on school grounds via School-Based Health Centers, including access to long-acting reversible contraceptives and the morning-after pill.^{22,36} Even so, our study is one of the first to examine sexual orientation and pregnancy risk among high-school students in a large, diverse, urban school district.

Conclusions

Our findings provide further evidence that sexual-minority youths are at increased risk for adolescent pregnancy; however, we also found that the mechanisms underlying this higher risk

may differ by gender. Results from this investigation suggest that current pregnancy-prevention efforts focused exclusively on heterosexual adolescents are too narrow and that these campaigns should seek ways to become more inclusive of diverse populations of sexual-minority youths. Moreover, future research efforts should, where possible, assess pregnancy risk on the basis of gender identity, as virtually nothing exists in the research literature on adolescent pregnancy among transgender youths. Lastly, adolescent pregnancy-prevention researchers may need to look beyond traditional risk factors when trying to identify the mechanisms that contribute to pregnancy risk among sexual-minority

youths. Such efforts are vital, not only for the development of LGB-appropriate adolescent pregnancy-prevention interventions, but also for the continued success in reducing US adolescent pregnancy rates. ■

About the Authors

Lisa L. Lindley is with the Department of Global and Community Health, George Mason University, Fairfax, VA. Katrina M. Walsemann is with the Department of Health Promotion, Education, and Behavior, Arnold School of Public Health, University of South Carolina, Columbia.

Correspondence should be sent to Lisa L. Lindley, Department of Global and Community Health, George Mason University, 4400 University Dr, MS 5B7, Fairfax, VA 22030 (e-mail: llindley@gmu.edu). Reprints can be ordered at <http://www.ajph.org> by clicking the "Reprints" link.

This article was accepted January 1, 2015.

Contributors

L. L. Lindley conceptualized the study and led the writing. K. M. Walsemann assisted with the conceptualization of the study and writing and conducted the data analysis.

Human Participant Protection

The Youth Risk Behavior Surveillance System was reviewed and approved by an institutional review board at the Centers for Disease Control and Prevention. No protocol approval was needed for this study.

References

- Kost K, Henshaw S. US teenage pregnancies, births and abortions, 2010: national and state trends by age, race and ethnicity. Available at: <http://www.guttmacher.org/pubs/USTPtrends10.pdf>. Accessed May 5, 2014.
- New York City Department of Health and Mental Hygiene. Health department data shows steady decline in teen pregnancy rate. Available at: <http://www.nyc.gov/html/doh/html/pr2013/pr012-13.shtml>. Accessed May 5, 2014.
- Finer LB, Zolna MR. Shifts in intended and unintended pregnancies in the United States, 2001–2008. *Am J Public Health*. 2014;104(suppl 1):S43–S48.
- Singh S, Sedgh G, Hussain R. Unintended pregnancy: worldwide levels, trends and outcomes. *Stud Fam Plann*. 2010;41(4):241–250.
- Sawyc EM, Skay CL, Bearinger LH, Blum RW, Resnick MD. Sexual orientation, sexual behaviors, and pregnancy among American Indian adolescents. *J Adolesc Health*. 1998;23(4):238–247.
- Sawyc EM, Bearinger LH, Blum RW, Resnick MD. Sexual intercourse, abuse and pregnancy among adolescent women: does sexual orientation make a difference? *Fam Plann Perspect*. 1999;31(3):127–131.
- Blake SM, Ledsky R, Lehman T, Goodenow C, Sawyer R, Hack T. Preventing sexual risk behaviors among gay, lesbian, and bisexual adolescents: the benefits of gay-sensitive HIV instruction in schools. *Am J Public Health*. 2001;91(6):940–946.
- Sawyc EM, Poon CS, Homma Y, Skay CL. Stigma management? The links between enacted stigma and teen pregnancy trends among gay, lesbian, and bisexual students in British Columbia. *Can J Hum Sex*. 2008;17(3):123–139.
- Charlton BM, Corliss HL, Missmer SA, Rosario M, Spiegelman D, Austin B. Sexual orientation differences in teen pregnancy and hormonal contraceptive use: an examination across 2 generations. *Am J Obstet Gynecol*. 2013;209(3):204.e1–8.
- Tornello SL, Riskind RG, Patterson CJ. Sexual orientation and sexual and reproductive health among adolescent young women in the United States. *J Adolesc Health*. 2014;54(2):160–168.
- Kirby D, Lepore G. Sexual risk and protective factors: factors affecting teen sexual behavior, pregnancy, childbearing and sexually transmitted disease: which are important? Which can you change? Washington, DC: The National Campaign to Prevent Teen and Unplanned Pregnancy; 2007.
- Korchmaros JD, Powell C, Stevens S. Chasing sexual orientation: a comparison of commonly used single-indicator measures of sexual orientation. *J Homosex*. 2013;60(4):596–614.
- Diamond LM. What we got wrong about sexual identity development: unexpected findings from a longitudinal study of young women. In: Omoto AM, Kurtzman HS, eds. *Sexual Orientation and Mental Health: Examining Identity and Development in Lesbian, Gay, and Bisexual People*. Washington, DC: American Psychological Association; 2006:73–94.
- Diamond LM. Female bisexuality from adolescence to adulthood: results from a 10-year longitudinal study. *Dev Psychol*. 2008;44(1):5–14.
- Savin-Williams RC. *The New Gay Teenager*. Cambridge, MA: Harvard University Press; 2005.
- Laumann E, Gagnon J, Michael R, Michaels F. *The Social Organization of Sexuality: Sexual Practices in the United States*. Chicago, IL: University of Chicago Press; 1994.
- Badgett L, Goldberg NE. *Best Practices for Asking Questions About Sexual Orientation on Surveys*. Los Angeles, CA: The Williams Institute; 2009.
- Igartua K, Thombs B, Burgos G, Montoro R. Concordance and discrepancy in sexual identity, attraction, and behavior among adolescents. *J Adolesc Health*. 2009;45(6):602–608.
- Centers for Disease Control and Prevention, Brener ND, Kann L, et al. Methodology of the Youth Risk Behavior Surveillance System—2013. *MMWR Recomm Rep*. 2013;62(RR-1):1–20.
- Centers for Disease Control and Prevention. Sexual identity, sex of sexual contacts, and health-risk behaviors among students in grades 9–12—Youth Risk Behavior Surveillance, selected sites, United States, 2001–2009. *MMWR Surveill Summ*. 2011;60(7):1–133.
- New York City Department of Health and Mental Hygiene. Comprehensive YRBS methods report. 2012. Available at: <http://www.nyc.gov/html/doh/html/data/youth-risk-behavior.shtml>. Accessed September 27, 2013.
- New York City Department of Education. School Based Health Centers. Available at: <http://schools.nyc.gov/Offices/Health/SBHC/SBHC.htm>. Accessed November 7, 2014.
- O'Brien RM. A caution regarding rules of thumb for variance inflation factors. *Qual Quant*. 2007;41(5):673–690.
- Breen R, Karlson K, Holm A. Total, direct, and indirect effects in logit and probit models. *Sociol Methods Res*. 2013;42(2):164–191.
- Chandy JM, Blum RQ, Resnick MD. History of sexual abuse and parental alcohol misuse: risk, outcomes and protective factors in adolescents. *Child Adolesc Social Work J*. 1996;13(5):411–432.
- Pierre N, Shrier LA, Emans SJ, DuRant RH. Adolescent males involved in pregnancy: associations of forced sexual contact and risk behaviors. *J Adolesc Health*. 1998;23(6):364–369.
- Raj A, Silverman JG, Amaro H. The relationship between sexual abuse and sexual risk among high school students: findings from the 1997 Massachusetts Youth Risk Behavior Survey. *Matern Child Health J*. 2000;4(2):125–134.
- Sawyc EM, Magee LL, Pettingell SE. Teenage pregnancy and associated risk behaviors among sexually abused adolescents. *Perspect Sex Reprod Health*. 2004;36(3):98–105.
- Resnick MD, Chambliss SA, Blum RW. Health and risk behaviors of urban adolescent males involved in pregnancy. *Fam Soc*. 1993;74(6):366–374.
- Russell ST, Driscoll AK, Truong N. Adolescent same sex romantic attractions and relationships: implications for substance use and abuse. *Am J Public Health*. 2002;92(2):198–202.
- Russell ST, Seif H. Bisexual female adolescents: a critical analysis of past research, and results from a national survey. *J Bisex*. 2002;2(2-3):73–94.
- Udry JR, Chantala K. Risk assessment of adolescents with same-sex relationships. *J Adolesc Health*. 2002;31(1):84–92.
- Gattis MN, Sacco P, Cunningham-Williams RM. Substance use and mental health disorders among heterosexual identified men and women who have same-sex partners or same-sex attraction: results from the National Epidemiological Survey on Alcohol and Related Conditions. *Arch Sex Behav*. 2012;41(5):1185–1197.
- Reback CJ, Larkins S. HIV risk behaviors among a sample of heterosexual identified men who occasionally have sex with another male and/or a transwoman. *J Sex Res*. 2013;50(2):151–163.
- Zhao Y, Montoro R, Igartua K, Thombs BD. Suicidal ideation and attempt among adolescents reporting “unsure” sexual identity or heterosexual identity and same sex attractions or behavior: forgotten groups? *J Am Acad Child Adolesc Psychiatry*. 2010;49(2):104–113.
- Hartocollis A, Bond M. Ready access to Plan B pills in city schools. *New York Times*. July 11, 2013. Available at: http://www.nytimes.com/2013/07/12/nyregion/in-new-york-schools-students-find-access-to-morning-after-pill.html?pagewanted=all&_r=0. Accessed November 7, 2014.