

Adverse Childhood Experiences Related to Poor Adult Health Among Lesbian, Gay, and Bisexual Individuals

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Objectives. We explored the association of sexual orientation with poor adult health outcomes before and after adjustment for exposure to adverse childhood experiences (ACEs).

Methods. Data were from the 2012 North Carolina, 2011 Washington, and 2011 and 2012 Wisconsin Behavioral Risk Factor Surveillance System (BRFSS) surveys regarding health risks, perceived poor health, and chronic conditions by sexual orientation and 8 categories of ACEs. There were 711 lesbian, gay, and bisexual (LGB) respondents and 29 690 heterosexual respondents.

Results. LGB individuals had a higher prevalence of all ACEs than heterosexuals, with odds ratios ranging from 1.4 to 3.1. After adjustment for cumulative exposure to ACEs, sexual orientation was no longer associated with poor physical health, current smoking, and binge drinking. Associations with poor mental health, activity limitation, HIV risk behaviors, current asthma, depression, and disability remained, but were attenuated.

Conclusions. The higher prevalence of ACEs among LGB individuals may account for some of their excess risk for poor adult health outcomes. (*Am J Public Health.* 2016;106:314–320. doi:10.2105/AJPH.2015.302904)

Individuals identifying as lesbian, gay, or bisexual (LGB) make up between 2% and 6% of the US population, but they have been largely neglected by public health research.^{1–3} Inclusion of questions regarding sexual orientation on population-based surveys such as the Behavioral Risk Factor Surveillance System (BRFSS) survey, the National Health Interview Survey (NHIS), and others has helped public health and clinical practitioners identify health disparities and unique risk factors among this population.⁴ Even so, the existing research remains limited, with a heavy reliance on convenience samples, lack of comparison of LGB individuals with heterosexuals, and little data regarding disparities in physical health outcomes.⁵ The Institute of Medicine and *Healthy People 2020* have identified health disparities and risk and protective factors among the LGB population as one of the main gaps in current health research.^{5,6}

Several studies have documented mental health and substance abuse disparities among LGB individuals. A recent meta-analysis

found the risk of lifetime or past-year depression, anxiety, and alcohol and other substance dependence to be higher among LGB individuals than among heterosexuals.⁷ Results from population-based studies have demonstrated an increased prevalence of smoking among LGB individuals compared with heterosexuals.^{8–10} Results from the 2013 NHIS parallel these findings, with a higher prevalence of current smoking, binge drinking, and psychological distress among LGB individuals than among heterosexuals.¹ Research regarding physical health outcomes, although more limited, has found LGB individuals to have a higher prevalence of

asthma and activity limitation than heterosexuals, and lesbian and bisexual women to have a higher prevalence of asthma, poor physical health, cardiovascular disease risk, and obesity than heterosexual women.^{9–12}

Research has also identified disparities by sexual orientation for certain forms of childhood abuse and trauma. Both population- and community-based studies have found that a greater proportion of LGB adults report childhood sexual, physical, and emotional abuse than do heterosexual adults.^{13–18}

A comprehensive review of the literature found that approximately 22.7% of gay and bisexual men and 34.5% of lesbian and bisexual women reported childhood sexual abuse. In that review, a direct comparison with experiences of childhood sexual abuse among heterosexual adults was not possible, given the relatively limited number of studies that have collected such comparison data.¹³ However, data from the National Epidemiologic Survey on Alcohol and Related Conditions found lesbian and bisexual women to be 3 times as likely as heterosexual women to report childhood sexual abuse, and gay men to be twice as likely as heterosexual men to report such abuse.¹⁴ Data from the National Study of Midlife Development in the United States revealed a greater proportion of LGB individuals than heterosexuals to report physical and emotional maltreatment by their parents.¹⁵

To date, research on experiences of childhood abuse and trauma among the LGB population has lacked inclusion of measures of

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This article was accepted September 7, 2015.

doi: 10.2105/AJPH.2015.302904

household dysfunction such as witnessing domestic violence or parental substance abuse in the household. A recent systematic review of the literature identified only 5 studies that examined experiences of household dysfunction among LGB individuals.¹⁹ The most comprehensive of these studies, by Andersen and Blosnich,²⁰ used a population-based sample of both LGB individuals and heterosexuals who responded to questions on the adverse childhood experience (ACE) scale. The ACE scale captures 3 categories of childhood abuse (sexual, physical, and emotional abuse) and 5 categories of household dysfunction (adult mental illness, substance abuse, and domestic violence in the household; incarceration of a household member; and parental divorce or separation). In the Andersen and Blosnich study, LGB adults were more likely than heterosexuals to report each category of childhood abuse and all categories of household dysfunction, except parental divorce or separation. LGB individuals were also more likely to report exposure to more than 1 ACE category, or multiple ACEs, than heterosexuals.²⁰ Such findings are important because cumulative exposure to childhood abuse and household dysfunction has been linked to numerous poor outcomes in adulthood among the general population.^{21,22} However, no other studies have addressed cumulative exposure to childhood abuse and trauma among the LGB population.¹⁹

Despite research indicating that LGB individuals are at increased risk for both childhood adversity and certain health disparities, there has been relatively little research exploring the association between these constructs by sexual orientation.²³ The National Alcohol Survey found that the association between sexual orientation and hazardous drinking among women was attenuated after adjustment for childhood sexual and physical abuse.²⁴ In an analysis of the National Longitudinal Study of Adolescent Health, greater exposure to childhood physical or sexual abuse, homelessness, and intimate partner violence explained between 10% and 20% of the excess in risk of tobacco use, drug and alcohol abuse, and depression among LGB adolescents compared with heterosexuals.²⁵ The majority of these studies focused only on sexual or physical abuse, and none included an assessment of cumulative exposure to multiple

forms of childhood abuse and household dysfunction using the ACEs scale.

We used a population-based sample of both LGB and heterosexual individuals to examine the association of sexual orientation with health risks, perceived poor health, and chronic conditions in adulthood before and after adjustment for cumulative exposure to ACEs.

METHODS

Data were from the 2012 North Carolina, 2011 Washington, and 2011 and 2012 Wisconsin BRFSS surveys. The BRFSS survey is a random-digit-dial telephone survey of the health and health practices of non-institutionalized resident adults aged 18 years and older. The survey is administered and supported by the Centers for Disease Control and Prevention (CDC) and managed by each state health department in the United States. The BRFSS survey has included both landline and cell phone interviews since 2011.²⁶ The 2012 North Carolina, 2011 Washington, and 2011 and 2012 Wisconsin surveys gathered self-reported sexual orientation and included the CDC optional ACE module.

Adverse Childhood Experience Module and Score

We captured data on ACEs by using the ACE module included on each state survey (Table A, available as a supplement to the online version of this article at <http://www.ajph.org>). The ACE module consists of 11 questions that measure childhood events experienced before age 18. We coded responses of “don’t know” or “refused” as “missing.”

The ACE score is a standardized score based on responses to the ACE module and measures cumulative exposure to ACEs rather than the frequency or severity of the events experienced. To calculate the score, we used the 11 module questions to capture 8 ACE categories (Table A). Exposure to any single category counted as 1 point toward the score. The final score was the sum of the total number of points accumulated and ranged from 0 to 8.

Sexual Orientation

To assess sexual orientation, survey respondents were asked whether they considered themselves to be heterosexual or

straight; homosexual, gay, or lesbian; bisexual; or something else. We categorized responses of homosexual, gay, or lesbian and bisexual as LGB and excluded responses of “something else.” The percentage of respondents categorized as LGB did not differ significantly by state or year (data not shown).

Measures

Demographic characteristics of respondents included gender, age, race, income, employment, education level, and marital status.

Health risks included 5 self-report indicators: current smoking (having smoked ≥ 100 cigarettes and currently smoking on some days or every day²⁷), binge drinking (≥ 5 drinks for males and ≥ 4 drinks for females on 1 or more occasions in the past month²⁸), heavy drinking (> 2 drinks per day for males and > 1 drink per day for females), obesity (body mass index ≥ 30 kg/m²),²⁹ and HIV risk behaviors (intravenous drug use, been treated for a sexually transmitted disease, given or received money or drugs for sex, or had anal sex without a condom in past year).

Perceived poor health included 4 self-report indicators: 14 or more days of poor physical health in the past 30 days, 14 or more days of poor mental health in the past 30 days, 14 or more days with an activity limitation attributable to poor physical or mental health in the past 30 days,³⁰ and fair or poor overall health.

Chronic conditions included 8 doctor-diagnosed conditions: current asthma, cardiovascular disease, diabetes, depressive disorder, disability, chronic obstructive pulmonary disease, arthritis, and cancer (other than skin).

Statistical Analysis

We calculated the prevalence and χ^2 *P* value of demographic characteristics and the ACE score by sexual orientation. For each ACE category, we calculated the prevalence and unadjusted odds ratio for LGB individuals compared with heterosexuals. For each indicator of health risks, perceived poor health, and chronic conditions, we constructed separate multivariable logistic regression models, with sexual orientation as the primary independent variable. The first set of models adjusted for gender, age, marital status, and

income. Perceived poor health and chronic conditions models also adjusted for current smoking, because this factor varied by both sexual orientation and the outcomes of interest. We added the ACE score to the second set of models. All percentages shown are weighted percentages. We conducted analyses with SAS version 9.3 (SAS Institute, Cary, NC).

RESULTS

A total of 30 401 participants responded to both the ACE module and the sexual orientation question, for a response rate of 81.6%. A total of 711 respondents (2.6%; 95% confidence interval [CI] = 2.3%, 2.9%) identified as LGB. Demographic characteristics of the sample are presented in Table 1. We observed significant differences by sexual orientation for gender, age, income, employment, and marital status. There were higher proportions of females, younger respondents, respondents with less than \$15 000 annual income, respondents who were unable to work, and respondents who were never married among LGB individuals than among heterosexuals.

Adverse Childhood Experiences

Table 2 shows the prevalence and unadjusted odds ratios for each ACE category by sexual orientation. LGB individuals were significantly more likely than heterosexuals to report each ACE category. The greatest increases in odds were for sexual abuse (odds ratio [OR] = 3.11; 95% CI = 2.44, 3.95), adult mental illness in the household (OR = 2.46; 95% CI = 1.95, 3.10), and an incarcerated household member (OR = 2.15; 95% CI = 1.55, 2.98).

We observed significant differences in ACE score by sexual orientation (Table 3). Only one fourth (26.8%) of LGB individuals reported no ACEs compared with 40.4% of heterosexuals. A greater proportion of heterosexuals (23.1%) than LGB individuals (18.7%) reported 1 ACE. Similar proportions of heterosexuals (12.7%) and LGB individuals (12.2%) reported 2 ACEs. However, a greater proportion of LGB individuals (42.4%) than heterosexuals (23.9%) reported between 3 and 8 ACEs.

TABLE 1—Self-Reported Sexual Orientation, by Demographic Characteristics: 2012 North Carolina, 2011 Washington, and 2011 and 2012 Wisconsin Behavioral Risk Factor Surveillance System Surveys

Characteristic	Lesbian, Gay, or Bisexual, No. (%)	Heterosexual, No. (%)
Gender*		
Male	299 (41.9)	11 949 (48.9)
Female	412 (58.1)	17 741 (51.1)
Age,*** y		
18–44	273 (61.8)	7 670 (45.6)
45–54	152 (18.1)	5 356 (19.8)
55–64	144 (10.8)	7 100 (17.2)
≥ 65	140 (9.3)	9 378 (17.4)
Income,** \$		
< 15 000	94 (14.4)	2 340 (8.8)
15 000–49 999	318 (46.8)	12 522 (46.7)
≥ 50 000	246 (38.8)	11 216 (44.5)
Employment***		
Employed	361 (52.7)	14 484 (58.1)
Unable to work	92 (12.6)	1 914 (5.5)
All other	258 (34.8)	13 228 (36.4)
Marital status***		
Married	95 (12.5)	16 759 (55.8)
Never married	298 (50.4)	3 734 (21.7)
Unmarried partner	145 (20.5)	746 (3.9)
All other	169 (16.6)	8 376 (18.5)
Race		
White	577 (77.8)	24 969 (82.1)
Black	78 (13.2)	2 379 (10.1)
Other	51 (9.1)	1 962 (7.8)
Education		
≤ high school	202 (34.2)	10 207 (39.9)
Post-high school	208 (35.0)	8 915 (33.7)
College	201 (30.8)	10 526 (26.4)

P* < .05; *P* < .01; ****P* < .001. *P* values determined by χ^2 test.

Health Risks, Perceived Poor Health, and Chronic Conditions

Results from multivariate analyses are presented in Table 4. In the first set of multivariate logistic regression models, sexual orientation was significantly associated with several health risks after adjustment for demographics. Sexual orientation was also significantly associated with several indicators of perceived poor health and doctor-diagnosed chronic conditions after adjustment for demographics and current smoking. In the second set of models, which included the ACE score as an additional covariate, sexual orientation was no longer significantly associated with current

smoking (OR = 1.13; 95% CI = 0.87, 1.48), binge drinking (OR = 1.28; 95% CI = 0.96, 1.71), or 14 or more days of poor physical health in the past 30 days (OR = 1.11; 95% CI = 0.78, 1.58). Significant associations between sexual orientation and 14 or more days of poor mental health (OR = 1.68; 95% CI = 1.24, 2.29) and activity limitation (OR = 1.53; 95% CI = 1.05, 2.23) in the past 30 days, HIV risk behaviors (OR = 3.87; 95% CI = 2.70, 5.56), current asthma (OR = 1.55; 95% CI = 1.09, 2.19), depression (OR = 1.88; 95% CI = 1.46, 2.41), and disability (OR = 1.44; 95% CI = 1.11, 1.86) remained, but were slightly attenuated.

TABLE 2—Adverse Childhood Experience (ACE) Categories, by Sexual Orientation: 2012 North Carolina, 2011 Washington, and 2011 and 2012 Wisconsin Behavioral Risk Factor Surveillance System Surveys

ACE Category	Lesbian, Gay, or Bisexual, No. (Weighted %)	Heterosexual, No. (Weighted %)	Unadjusted OR (95% CI)
Physical abuse	210 (29.7)	4828 (17.0)	2.05 (1.62, 2.61)
Sexual abuse	217 (29.1)	3959 (11.7)	3.11 (2.44, 3.95)
Emotional abuse	328 (43.8)	8101 (28.3)	1.97 (1.57, 2.45)
Parental separation or divorce	220 (34.7)	6849 (27.0)	1.43 (1.14, 1.80)
Adult mental illness in household	229 (33.2)	4755 (16.8)	2.46 (1.95, 3.10)
Adult substance abuse in household	284 (39.8)	8235 (28.0)	1.69 (1.36, 2.11)
Incarcerated household member	79 (15.5)	1645 (7.9)	2.15 (1.55, 2.98)
Violence between adults in household	187 (27.1)	4934 (17.4)	1.77 (1.39, 2.26)

Note. OR = odds ratio; CI = confidence interval.

DISCUSSION

We used a population-based sample of both LGB and heterosexual individuals to examine the prevalence of ACEs by sexual orientation and explore the association of sexual orientation with a range of poor adult health outcomes before and after accounting for cumulative exposure to ACEs. We found that LGB adults were more likely than heterosexual adults to report each ACE category. Several previous studies have documented a higher prevalence of childhood abuse among LGB individuals,^{12–18} but few have examined the prevalence of indicators of household dysfunction or employed the ACE scale among sexual minorities.¹⁹ We found that, compared with heterosexuals, LGB individuals had increased odds of exposure to 1

category of childhood abuse and 2 categories of household dysfunction; specifically, they were 3 times as likely to report childhood sexual abuse and more than twice as likely to report either adult mental illness in the household or an incarcerated household member. Previous research has suggested that gender-nonconforming behavior among children who later identify as LGB or “acting out” behaviors such as substance use among sexual minority youths may explain the increased prevalence of childhood abuse observed among sexual minority populations.^{15,16,20} However, it is not clear whether such behavior could also account for the increased prevalence of household dysfunction. Findings of a higher prevalence of household dysfunction in addition to

childhood abuse among LGB individuals provide a rationale for assessing exposure to both public health research and surveillance as well as preventive and clinical programs serving sexual minorities.

We also found that a significantly higher proportion of LGB individuals than heterosexuals reported exposure to multiple ACEs. Approximately 2 of 5 LGB individuals reported exposure to 3 or more ACEs whereas 1 of 5 heterosexuals reported such exposure. Moreover, 15% of LGB individuals reported 6 or more ACEs compared with less than 5% of heterosexuals. The importance of exposure to cumulative childhood adversity has been demonstrated in several studies. Exposure to 6 or more ACEs has been found to reduce life expectancy by an average of 20 years compared with exposure to no ACEs.³¹ Increasing ACE exposure has been linked to increased risk for liver disease, lung cancer, alcohol and drug abuse, depression, suicide attempts, and numerous other poor outcomes.^{21,22,32–37} Programmatic and clinical providers should be aware of the potential for a history of exposure to multiple ACEs among LGB individuals and the implications of these experiences for physical and mental health outcomes. In addition, services that are sensitive to childhood adversity and the unique experiences of the LGB population can help prevent revictimization in adulthood. Research has found that victims of childhood abuse and trauma are at increased risk for experiencing additional abuse in adulthood, with some research indicating a particularly increased risk among sexual minorities.^{24,38–42}

TABLE 3—Adverse Childhood Experience (ACE) Score, by Sexual Orientation: 2012 North Carolina, 2011 Washington, and 2011 and 2012 Wisconsin Behavioral Risk Factor Surveillance System Surveys

ACE Score***	Lesbian, Gay, or Bisexual, No. (Weighted %)	Heterosexual, No. (Weighted %)
0	183 (26.8)	12 971 (40.4)
1	148 (18.7)	6 663 (23.1)
2	94 (12.2)	3 695 (12.7)
3	82 (11.9)	2 411 (8.7)
4	70 (9.4)	1 697 (6.1)
5	49 (6.5)	1 121 (4.2)
6	41 (6.3)	683 (2.8)
7	36 (5.7)	348 (1.6)
8	8 (2.6)	101 (0.5)

Note. The ACE score is the total number of ACEs to which the individual was exposed before the age of 18 years.

****P* < .001. *P* value determined by χ^2 test.

TABLE 4—Prevalence and Adjusted Odds Ratios for Health Indicators: 2012 North Carolina, 2011 Washington, and 2011 and 2012 Wisconsin Behavioral Risk Factor Surveillance System Surveys

Health Indicator	LGB, % (n = 711; 2.6%)	Heterosexual, % (n = 29 690; 97.3%)	LGB vs Heterosexual, AOR ^a (95% CI)	LGB vs Heterosexual, AOR ^b (95% CI)
Health risks^c				
Current smoker	31.2	19.7	1.36 (1.06, 1.74)	1.13 (0.87, 1.48)
Binge drinking	29.2	18.6	1.35 (1.02, 1.79)	1.28 (0.96, 1.71)
Heavy drinking	9.9	6.9	1.16 (0.75, 1.79)	1.02 (0.65, 1.60)
Obese	30.7	28.8	0.81 (0.63, 1.03)	0.87 (0.68, 1.12)
HIV risk behaviors	20.0	3.4	4.67 (3.36, 6.50)	3.87 (2.70, 5.56)
Perceived poor health^d				
Fair or poor general health	20.3	16.0	1.28 (0.94, 1.74)	1.09 (0.79, 1.50)
≥14 d of poor physical health in past 30 d	16.9	11.2	1.54 (1.08, 2.18)	1.11 (0.78, 1.58)
≥14 d of poor mental health in past 30 d	26.8	10.9	2.22 (1.62, 2.97)	1.68 (1.24, 2.29)
≥14 d of activity limitation in past 30 d	12.9	7.2	2.01 (1.41, 2.87)	1.53 (1.05, 2.23)
Chronic conditions^d				
Current asthma	15.1	8.4	1.81 (1.30, 2.54)	1.55 (1.09, 2.19)
CVD	8.7	7.9	1.42 (0.92, 2.20)	1.43 (0.94, 2.19)
Diabetes	8.7	9.2	1.24 (0.88, 1.75)	1.18 (0.83, 1.67)
Depressive disorder	37.6	17.0	2.42 (1.91, 3.07)	1.88 (1.46, 2.41)
Disability	32.6	23.8	1.71 (1.32, 2.20)	1.44 (1.11, 1.86)
COPD	6.3	5.4	1.17 (0.75, 1.83)	1.07 (0.68, 1.70)
Arthritis	23.6	25.5	1.31 (0.98, 1.76)	1.18 (0.87, 1.59)
Cancer (other than skin)	6.8	6.2	1.27 (0.80, 2.00)	1.19 (0.73, 1.93)

Note. AOR = adjusted odds ratio; CI = confidence interval; CVD = cardiovascular disease; COPD = chronic obstructive pulmonary disease; LGB = lesbian, gay, or bisexual.

^aAOR not adjusted for adverse childhood experiences score.

^bAOR adjusted for adverse childhood experiences score.

^cAOR adjusted for gender, age, marital status, and income.

^dAOR adjusted for gender, age, marital status, income, and current smoking.

In multivariate analyses, after adjustment for the ACE score, sexual orientation was no longer associated with current smoking, binge drinking, or 14 or more days of poor physical health in the past 30 days. Associations of sexual orientation with several other indicators of perceived poor health, health risks, and chronic conditions remained significant after adjustment for ACE score, but were slightly attenuated. Such findings indicate that the higher prevalence of ACEs among LGB individuals may explain some, but not all, of the excess risk for certain poor adult health outcomes among LGB individuals. In addition, the results suggest that ACEs may account for a greater proportion of the excess risk for certain outcomes, such as current smoking, binge drinking, and poor physical health, than for other outcomes, although such findings need to be replicated in additional research. We were not able to examine other potential mediating factors in the association between sexual orientation and

poor adult health outcomes, such as adult victimization and experiences of stigma, prejudice, and discrimination, but they may further explain some of the excess risk for these outcomes and elucidate mechanisms by which these mediating effects occur.^{24,43} Even so, these findings suggest that primary prevention of ACEs, as well as services designed to help LGB individuals recognize and cope with the stress of childhood adversity, may be an effective strategy to improve long-term outcomes and reduce health disparities by sexual orientation. A greater understanding of the potential contribution of ACEs to health disparities among LGB individuals will help to inform these prevention and intervention efforts.

Limitations

Several limitations are worth noting. The cross-sectional nature of the BRFSS survey limits the ability to draw causal conclusions

about observed associations between sexual orientation and ACEs and poor adult health outcomes. In addition, the BRFSS survey includes only adults who live in a household with a landline or cellular telephone. Institutionalized individuals, including those living in nursing homes, prisons, or hospitals, are excluded, as are those who do not have a landline or cellular telephone. Although we conducted the analyses on a population-based sample, the data represent 3 states, which limits the generalizability of the findings.

A further limitation is that the BRFSS survey relies on retrospective self-reports of ACEs, which may result in response biases. Research into potential biases of ACE questions has found that retrospective self-reports of ACEs are probably an underestimation rather than overestimation of true ACE exposure, and the test-retest reliability of responses to questions about ACEs has been found to be good.^{44,45} More

specifically, it is possible that recall or willingness to report ACEs may differ by sexual orientation. LGB individuals may be more willing to report sensitive or potentially stigmatizing experiences such as childhood adversity because reporting sexual minority orientation already requires disclosure of personal and potentially stigmatizing information.^{15,17} Finally, the sample size did not permit analyses stratified by gender or by specific orientations within the LGB population (e.g., bisexual women and lesbians), which emerging research has found to be important.^{20,24}

Conclusions

ACEs have an important effect on health and well-being regardless of sexual orientation. However, particular attention should be directed to ACEs among the LGB population, given the prevalence of such experiences among LGB individuals and the potential contribution of ACEs to health disparities by sexual orientation. ACEs are modifiable risk factors that can be addressed in research and surveillance, public health prevention efforts, and clinical interventions. Development of prevention and intervention efforts would benefit from an understanding of why LGB individuals have a higher prevalence of ACEs than heterosexuals, and how ACEs interact with other stressors commonly faced by sexual minorities—such as discrimination, stigma, and rejection—to contribute to health disparities. Research into factors that promote resiliency and mitigate poor outcomes among LGB individuals who have experienced childhood abuse and trauma may identify individual-, family-, and community-level strategies to improve well-being in this population. **AJPH**

CONTRIBUTORS

A. Austin conceptualized and designed the study, analyzed and interpreted the data, drafted and revised the content, and approved the final version to be published. H. Herrick designed the study, interpreted the data, revised the content, and approved the final version to be published. S. Proescholdbell revised the content and approved the final version to be published.

ACKNOWLEDGMENTS

This study was supported in part by an appointment to the Applied Epidemiology Fellowship Program administered by the Council of State and Territorial Epidemiologists and funded by the Centers for Disease Control and Prevention (CDC; 1U380T000143-01), funds from the CDC Core Violence and Injury Prevention Program (1V17CE002033), and funds from the CDC Rape Prevention and Education Program (1V17CE002242). This

study was also supported by the North Carolina Department of Health and Human Services, Division of Public Health, State Center for Health Statistics, Behavioral Risk Factor Surveillance System, Washington State Department of Health, Center for Health Statistics, Behavioral Risk Factor Surveillance System (U58/SO000047-1 through 3), and the Wisconsin Department of Health Services, Division of Public Health, Office of Health Informatics, Behavioral Risk Factor Surveillance System.

HUMAN PARTICIPANT PROTECTION

No protocol approval was necessary because data were obtained from secondary sources.

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