

# Asthma Disparities and Within-Group Differences in a National, Probability Sample of Same-Sex Partnered Adults

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Nearly 25 million Americans currently have asthma,<sup>1</sup> resulting in health care and absenteeism costs estimated at \$56 billion annually.<sup>1</sup> In addition to disparities in asthma identified by race/ethnicity,<sup>2,3</sup> gender,<sup>4</sup> and socioeconomic indicators,<sup>2</sup> developing literature also suggests a higher prevalence of asthma among gay, lesbian, and bisexual (i.e., sexual minority) populations.<sup>5-8</sup> However, most of the existing literature examining asthma in sexual minority populations is derived from state-based<sup>5-7,9</sup> or local surveys.<sup>10</sup> For example, in a population-based sample of Massachusetts adults, Conron et al.<sup>9</sup> found that self-identified gay or lesbian and bisexual individuals had a 48% and 39% increase, respectively, in odds of a lifetime diagnosis of asthma compared with their heterosexual peers.

To our knowledge, only 1 study has used a nationally drawn sample to examine asthma among persons in same-sex relationships. Heck and Jacobson<sup>8</sup> examined self-identified same-sex partnered adults in data from the National Health Interview Survey. Results showed significantly increased odds of self-reported lifetime asthma diagnosis and past-year asthma among same-sex partnered men and women, respectively, compared with heterosexually partnered persons. Although the National Health Interview Survey study provides key evidence of sexual minority asthma disparities compared with heterosexuals, it focused on between-group differences (same-sex partnered vs opposite-sex partnered). Further study is needed to explore possible differences among sexual minority populations, which is one of the recommendations in a recent Institute of Medicine report on lesbian, gay, bisexual, and transgender health. Additionally, the Institute of Medicine report calls for corroboration of findings that indicate disparity by examining health indicators from different population-based data sources.<sup>11</sup>

**Objectives.** We examined the prevalence and correlates of self-reported lifetime diagnosis of asthma and current asthma among same-sex and opposite-sex partnered adults.

**Methods.** Data were from the 2004 Behavioral Risk Factor Surveillance System, in which same-sex partnership was a response option to a family planning item in the core questionnaire. Self-reported lifetime diagnosis of asthma and current asthma were examined in logistic regression models adjusted for demographic characteristics and asthma-related confounding factors and stratified by both gender and same-sex partnership status.

**Results.** Significantly higher proportions of same-sex partnered male and female respondents reported lifetime and current asthma compared with their opposite-sex partnered peers. In adjusted analyses, same-sex partnership status remained significantly associated with asthma outcomes among men and women, with odds ratios ranging from 1.57 to 2.34.

**Conclusions.** Results corroborated past studies that indicated asthma disproportionately affects sexual minority populations. The addition of sexual minority status questions to federal survey projects is key to further exploring health disparities in this population. Future studies are needed to investigate the etiology of this disparity. (*Am J Public Health.* 2013;103:e83–e87. doi:10.2105/AJPH.2013.301217)

To these ends, the key aims of this study were to (1) examine the association between same-sex partnership status and prevalence of self-reported asthma within a representative, national sample of adults in the 2004 Behavioral Risk Factor Surveillance System (BRFSS), and (2) examine within-group differences by both gender and partnership status.

## METHODS

In 2004, the Centers for Disease Control and Prevention (CDC) added a Family Planning module to the core BRFSS questionnaire, which is required to be asked by all US states and territories and the District of Columbia to probability-based samples of noninstitutionalized adults aged 18 years or older. The response rate for the BRFSS in 2004 was 52.7%, and further information about the survey methodology is available from the CDC.<sup>12</sup> Interviewers administered the Family Planning

module to all men aged 18 to 60 years and all women aged 18 to 44 years who also did not have a hysterectomy or currently were not pregnant. Interviewers first asked:

Some things people do to keep from getting pregnant include not having sex at certain times, using birth control methods such as the pill, implants, shots, condoms, diaphragm, foam, IUD, having their tubes tied, or having a vasectomy. Are you or your [if female, insert "husband/partner," if male, insert "wife/partner"] doing anything now to keep [if female, insert "you," if male, insert "her"] from getting pregnant?

Response options included: Yes; No; No partner or not sexually active; Same-sex partner; Don't know or not sure; and Refuse to answer. For this project, those who reported a same-sex partner (n = 1077) constituted the same-sex partnered sample, and people who reported either yes or no to using birth control (n = 119 610) constituted the opposite-sex partnered sample. Respondents reporting no partner or not sexually active (n = 22 572), don't

know or not sure ( $n = 333$ ), and refusals ( $n = 3098$ ) were excluded from analysis.

Two dichotomous outcome measures of asthma were lifetime diagnosis (“Have you ever been told by a doctor, nurse or other health professional that you had asthma?”) and current asthma (“Do you still have asthma?”). Demographic characteristic covariates included a continuous measure of self-reported age, educational attainment (less than a high school diploma vs high school diploma or higher), race/ethnicity (non-Hispanic White vs non-White), and income as reported with an imputed variable calculated by the CDC (<\$25 000/year vs  $\geq$ \$25 000/year). Behavioral correlates of asthma included being overweight or obese as calculated by body mass index (defined as weight in kilograms divided by height in meters squared  $> 25$ ), being a current smoker (smoked  $\geq 100$  cigarettes in lifetime and currently smoke some days or every day), or being a person who smoked at some point in life but did not currently smoke (smoked  $> 100$  cigarettes in lifetime but did not smoke some days or every day).

Bivariate differences on all variables were assessed with the  $\chi^2$  test by gender and partnership status (e.g., same-sex partnered men were compared with opposite-sex partnered men), and the  $t$ -test was used to compare mean age. Two sets of logistic regression models, one set stratified by gender and one set stratified by gender and same- or opposite-sex partnership status, produced odds of self-reported lifetime diagnosis of asthma and current asthma. All analyses were weighted to account for sampling design and were conducted using Stata/SE version 12.<sup>13</sup> Statistically significant results were  $P < .05$ . In the multivariable analyses, missing data were handled with listwise deletion.

## RESULTS

Overall, the weighted proportion of the sample that reported having a same-sex partner was 0.82%. A significantly greater proportion of same-sex partnered women than opposite-sex partnered women reported earning less than \$25 000 per year. Same-sex partnered men and women were mostly similar to their opposite-sex partnered peers, except in 2 areas. First, a higher proportion of same-sex

partnered men than opposite-sex partnered men had educational attainment beyond a high school diploma, and more same-sex partnered women than opposite-sex partnered women reported lower incomes (Table 1). Same-sex partnered men and women experienced disproportionately higher prevalence on almost all risk correlates of asthma, except for ever smoking among men and overweight or obesity among men; significantly lower proportions of same-sex partnered men than opposite-sex partnered men were overweight or obese. Both indicators of asthma prevalence were higher for same-sex respondents, particularly among women.

In multiple logistic regression models adjusted for correlates of asthma (i.e., education, income, race/ethnicity, being overweight or obese, and current and former smoking), sexual minority status still exhibited significant associations with both lifetime diagnosis of asthma and current asthma. Of note, same-sex partnered men and women had more than twice the odds of current asthma than their opposite-sex partnered peers (Table 2).

In models examining within-group differences, overweight or obesity was strongly associated with increased odds of asthma among women and particularly among same-sex partnered women. Overweight or obese same-sex partnered women had more than 7 times the odds of reporting current asthma and 3 times the odds of reporting lifetime asthma than same-sex partnered women who were not overweight or obese (Table 3). In examining the heterogeneity within same-sex partnered men and women, the results suggested that persons of color might be a subgroup particularly affected by asthma. Specifically, among same-sex partnered women, persons of color had increased (although not statistically significant) odds of current asthma (adjusted odds ratio [AOR] = 2.31; 95% confidence interval [CI] = 0.96, 5.58;  $P = .062$ ), and a similar phenomenon was documented among same-sex partnered men for lifetime diagnosis (AOR = 2.26; 95% CI = 0.91, 5.61;  $P = .077$ ) and current asthma (AOR = 2.46; 95% CI = 0.89, 6.86;  $P = .084$ ).

## DISCUSSION

The present analysis was, to date, the largest sample of self-identified same-sex partnered

persons identified in a national survey, and the results corroborated the findings of the sole national study of asthma among same-sex partnered persons in which Heck and Jacobson<sup>8</sup> found evidence of a disparity in asthma among partnered sexual minority persons. Other surveys provided additional evidence of a disparity for sexual minority populations. For example, in a pooled analysis of BRFSS data from Massachusetts, Conron et al.<sup>9</sup> found that sexual minority women had an increased odds of asthma compared to heterosexual women. Cochran and Mays<sup>5</sup> also noted increased odds of asthma among homosexually experienced heterosexual men and women in the California Quality of Life Survey. Although definitions of sexual minority status differed, the present results supported these findings and indicated differences by gender.

For instance, being overweight or obese more often was associated with asthma among women than men; being overweight or obese was particularly salient for same-sex partnered women. Among sexual minority populations, sexual minority men are less likely to be overweight or obese than are heterosexual men,<sup>14</sup> whereas sexual minority women are more likely to be overweight or obese than are heterosexual women.<sup>15</sup> Because weight has clear correlations with asthma,<sup>16</sup> overweight or obesity might be more of a risk factor for and explain disparities in asthma among sexual minority women than among sexual minority men. Future research is needed to address whether interventions geared toward weight-related issues among sexual minority women might concurrently address asthma.

The lack of statistical significance for findings regarding race/ethnicity might result from limited power because of small sample sizes. Diversity among sexual minority populations is often overlooked or not analyzed because of small samples, and although our results were still hampered by small samples, these results offer some preliminary information, highlight potential areas of future study, and reiterate the need for research with persons who identify as both a racial/ethnic minority person and a sexual minority person.

Corroborating past studies, same-sex partnered persons in this sample had a significantly higher prevalence of smoking.<sup>17</sup> However, despite increased smoking prevalence, neither

**TABLE 1—Demographic Characteristics and Asthma Prevalence, by Gender and Partnership Status: Behavioral Risk Factor Surveillance System, United States, 2004**

Variable	Men		Women	
	Same-Sex Partnered (n = 644), No. (%) or Mean ±SE	Opposite-Sex Partnered (n = 65 735), No. (%) or Mean ±SE	Same-Sex Partnered (n = 433), No. (%) or Mean ±SE	Opposite-Sex Partnered (n = 53 875), No. (%) or Mean ±SE
<b>Demographic characteristics</b>				
Age, y	39.2 ±0.98	40.3 ±0.08	32.7 ±0.69	33.0 ±0.06
Non-White <sup>a</sup>	112 (24.4)	14 271 (27.1)	95 (27.4)	14 738 (32.5)
< high school diploma	23 (3.8)*	5430 (10.2)	22 (6.2)	4395 (9.9)
Income < \$25 000/y	126 (20.5)	11 148 (19.5)	140 (37.1)*	13 567 (27.3)
<b>Asthma-related covariates</b>				
Overweight/obese	341 (50.3)*	46 618 (71.1)	232 (60.4)*	23 904 (46.9)
Current smoker	214 (31.6)*	16 333 (25.2)	130 (35.5)*	12 581 (22.1)
Ever smoked	363 (54.5)	32 285 (48.9)	224 (59.1)*	20 446 (36.0)
<b>Asthma</b>				
Lifetime diagnosis	101 (16.6)*	7330 (11.4)	106 (26.1)*	8043 (14.6)
Current asthma	62 (12.3)*	3791 (5.9)	79 (21.4)*	5262 (9.5)

Note. Frequencies are unweighted counts; means, SEs, and percentages are weighted estimates.

<sup>a</sup>Non-White includes Hispanic.

\*P < .05.

current smoking nor a history of ever smoking were associated with asthma outcomes among same-sex partnered persons. Although it was logical to think that persons with asthma would be less likely to smoke, a systematic review of asthma and smoking found that people with asthma were no less likely to be smokers, and asthma did not diminish probability of becoming a smoker.<sup>18</sup> Consequently, smoking may not be revealing in explaining differences in self-reported diagnosis of asthma. However,

smoking is related to more adverse presentations and complications of asthma, and evidence suggests smoking is associated with onset of asthma.<sup>18</sup> Unfortunately, the national 2004 BRFSS core questionnaire did not assess asthma severity or age of onset. Further research is needed to explore nuances of asthma, beyond prevalence, among sexual minority populations and the potential impacts of smoking.

Because asthma could be affected by stress,<sup>19</sup> some researchers suggest that minority

stress—the experience of unique, added mental strain and distress because of societal persecution and devaluation of one’s minority status<sup>20</sup>—may play a role in explaining asthma disparities among sexual minority populations.<sup>5,6</sup> Additionally, victimization in general has been associated with asthma.<sup>21,22</sup> Although studies document that sexual minority persons are more likely to experience discrimination and victimization specifically related to their minority status,<sup>23,24</sup> the 2004 BRFSS did not

**TABLE 2—Adjusted Odds Ratios of Self-Reported Asthma Diagnoses, by Gender: Behavioral Risk Factor Surveillance System, United States, 2004**

Variable	Lifetime Diagnosis		Current Asthma	
	Men (n = 59 639), AOR (95% CI)	Women (n = 45 865), AOR (95% CI)	Men (n = 59 437), AOR (95% CI)	Women (n = 46 019), AOR (95% CI)
<b>Demographic characteristics</b>				
Age	0.98* (0.98, 0.99)	0.98* (0.98, 0.99)	1.00 (0.99, 1.00)	0.99 (0.98, 1.00)
Non-White <sup>a</sup>	0.95 (0.84, 1.07)	0.93 (0.83, 1.03)	0.85 (0.72, 1.00)	0.91 (0.79, 1.04)
< high school diploma	0.98 (0.83, 1.15)	0.96 (0.81, 1.14)	1.28* (1.05, 1.58)	1.13 (0.93, 1.38)
Income < \$25 000/y	1.19* (1.06, 1.35)	1.16* (1.04, 1.29)	1.34* (1.14, 1.58)	1.17* (1.03, 1.33)
Same-sex partnership status	1.57* (1.06, 2.34)	1.72* (1.11, 2.65)	2.34* (1.45, 3.79)	2.09* (1.30, 3.36)
<b>Asthma-related covariates</b>				
Overweight/obese	1.13* (1.03, 1.25)	1.46* (1.34, 1.59)	1.10 (0.97, 1.26)	1.61* (1.45, 1.79)
Current smoker	1.02 (0.90, 1.15)	1.01 (0.88, 1.15)	1.06 (0.90, 1.25)	1.10 (0.93, 1.30)
Ever smoked	1.06 (0.96, 1.18)	1.29* (1.14, 1.47)	0.88 (0.77, 1.00)	1.20* (1.02, 1.39)

Note. AOR = adjusted odds ratio; CI = confidence interval.

<sup>a</sup>Non-White includes Hispanic.

\*P < .05.

**TABLE 3—Adjusted Odds Ratios of Self-reported Asthma Diagnoses, by Gender and Partnership Status: Behavioral Risk Factor Surveillance System, United States, 2004**

Variable	Lifetime Diagnosis		Current Asthma	
	Same-Sex Partnered, No. or AOR (95% CI)	Opposite-Sex Partnered, No. or AOR (95% CI)	Same-Sex Partnered, No. or AOR (95% CI)	Opposite-Sex Partnered, No. or AOR (95% CI)
	<b>Men</b>			
Sample size	592	60 123	589	59 911
Demographic characteristics				
Age	0.98 (0.94, 1.02)	0.98* (0.98, 0.99)	0.98 (0.94, 1.03)	1.00 (0.99, 1.00)
Non-White <sup>a</sup>	2.26 (0.91, 5.61)	0.94 (0.83, 1.05)	2.46 (0.89, 6.86)	0.83* (0.70, 0.98)
< high school diploma	0.50 (0.13, 1.99)	0.98 (0.83, 1.15)	0.43 (0.08, 2.29)	1.29* (1.05, 1.59)
Income < \$25 000/y	0.85 (0.32, 2.25)	1.20* (1.06, 1.35)	0.58 (0.19, 1.77)	1.36* (1.16, 1.61)
Asthma-related covariates				
Overweight/obese	1.18 (0.54, 2.55)	1.13* (1.03, 1.25)	1.09 (0.49, 2.59)	1.10 (0.97, 1.26)
Current smoker	1.01 (0.33, 3.14)	1.02 (0.90, 1.16)	1.68 (0.48, 5.85)	1.05 (0.89, 1.25)
Ever smoked	1.22 (0.41, 3.68)	1.06 (0.95, 1.17)	0.61 (0.18, 1.99)	0.88 (0.77, 1.01)
	<b>Women</b>			
Sample size	395	46 235	392	46 079
Demographic characteristics				
Age	0.96 (0.91, 1.03)	0.98* (0.98, 0.99)	0.94* (0.89, 0.99)	0.99 (0.98, 1.00)
Non-White <sup>a</sup>	1.60 (0.72, 3.53)	0.92 (0.83, 1.03)	2.31 (0.96, 5.58)	0.90 (0.78, 1.03)
< high school diploma	4.15 (0.68, 25.35)	0.95 (0.80, 1.13)	4.91 (0.90, 26.79)	1.11 (0.91, 1.35)
Income < \$25 000/y	0.93 (0.39, 2.22)	1.17* (1.05, 1.30)	0.93 (0.34, 2.55)	1.18* (1.04, 1.34)
Asthma-related covariates				
Overweight/obese	3.06* (1.22, 7.70)	1.45* (1.33, 1.58)	7.13* (2.18, 23.31)	1.59* (1.43, 1.77)
Current smoker	0.49 (0.17, 1.42)	1.02 (0.88, 1.17)	0.40 (0.12, 1.36)	1.12 (0.94, 1.32)
Ever smoked	0.99 (0.35, 2.83)	1.29* (1.14, 1.47)	1.00 (0.30, 3.30)	1.19* (1.02, 1.39)

Note. AOR = adjusted odds ratio; CI = confidence interval.

<sup>a</sup>Non-White includes Hispanic.

\**P* < .05.

assess either of these characteristics. Future investigation of asthma disparities among sexual minority populations should strive to test potential moderating roles of minority stressors (e.g., discrimination, stigma, harassment, victimization). However, it is likely that integrating stress into the causal pathways of asthma disparities among sexual minorities may require different hypotheses with longitudinal data that include many factors, such as disclosure of sexual identity and issues encompassing self and familial acceptance of sexual identity.

Several limitations must be noted. First, the analytic sample was derived from a question that screened respondents based on several characteristics (e.g., age, gender), limiting generalizability. Second, the measure of sexual minority status we used was limited to only those who reported a same-sex partner, thus

missing single or unpartnered persons and failing to discern respondents' self-identified sexual identity. Moreover, a sample of only partnered people might bias estimates of outcomes because of characteristics associated with having a partner (e.g., social support and financial support). The wording of the question assumed heterosexuality and was in the context of pregnancy prevention, which might have affected disclosure of a same-sex partner. Asthma diagnoses were self-reported, and reports of ever being diagnosed with asthma might be prone to recall bias. Both education and income were analyzed as dichotomous variables and thus did not fully capture nuances of these determinants. Finally, the sample of sexual minority persons was small for comparing within-group identity, which limited statistical power and resulted in wide CIs for

estimates; these estimates should be interpreted with caution.

Although the present results confirmed and expanded on the burgeoning literature about sexual minority asthma disparities, further research is needed using additional data sources to identify the etiology, potential confounders, and within-group differences of asthma disparities among sexual minority populations. However, most national health surveillance systems do not assess sexual identity, and lesbian, gay, and bisexual populations. This omission hampers improved understanding of asthma disparities among sexual minorities. Better data could illuminate and make central the role of stress in asthma etiology, which could be relevant for other minority groups disproportionately affected by asthma, such as racial/ethnic minority communities. ■

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### Contributors

J. R. Blosnich identified the data set, conducted analyses, and led the writing of the article. J. G. L. Lee assisted in writing the Introduction and Discussion sections. R. Bossarte assisted in analyses and in writing components of the Methods and Discussion sections. V. M. B. Silenzio assisted in guiding the analytic plan and in writing parts of the Introduction and Discussion sections. All authors reviewed drafts of the article.

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### Human Participant Protection

Because the de-identified 2004 BRFSS national data set is publicly available through the Centers for Disease Control and Prevention Web site, this project was exempt from human participants research approval.

### References

- Barnett SBL, Nurmagametov TA. Costs of asthma in the United States: 2002-2007. *J Allergy Clin Immunol*. 2011;127(1):145-152.
- Drake KA, Galanter JM, Burchard EGL. Race, ethnicity and social class and the complex etiologies of asthma. *Pharmacogenomics*. 2008;9(4):453-462.
- McDaniel M, Paxson C, Waldfogel J. Racial disparities in childhood asthma in the United States: evidence from the National Health Interview Survey, 1997 to 2003. *Pediatrics*. 2006;117(5):e868-e877.
- Melgert BN, Ray A, Hylkema MN, Timens W, Postma DS. Are there reasons why adult asthma is more common in females? *Curr Allergy Asthma Rep*. 2007;7(2):143-150.
- Cochran SD, Mays VM. Physical health complaints among lesbians, gay men, and bisexual and homosexually experienced heterosexual individuals: results from the California Quality of Life Survey. *Am J Public Health*. 2007;97(11):2048-2055.
- Landers SJ, Mimiaga MJ, Conron KJ. Sexual orientation differences in asthma correlates in a population-based sample of adults. *Am J Public Health*. 2011;101(12):2238-2241.
- Dilley JA, Simmons KW, Boysun MJ, Pizacani BA, Stark MJ. Demonstrating the importance and feasibility of including sexual orientation in public health surveys: health disparities in the Pacific Northwest. *Am J Public Health*. 2010;100(3):460-467.
- Heck JE, Jacobson JS. Asthma diagnosis among individuals in same-sex relationships. *J Asthma*. 2006;43(8):579-584.
- Conron KJ, Mimiaga MJ, Landers SJ. A population-based study of sexual orientation identity and gender differences in adult health. *Am J Public Health*. 2010;100(10):1953-1960.
- Diamant AL, Wold C. Sexual orientation and variation in physical and mental health status among women. *J Womens Health (Larchmt)*. 2003;12(1):41-49.
- Institute of Medicine. *The Health of Lesbian, Gay, Bisexual, and Transgender People: Building a Foundation for Better Understanding*. Washington, DC: Institute of Medicine; 2011.
- Centers for Disease Control and Prevention. BRFSS: Turning information into health. 2011. Available at: <http://www.cdc.gov/brfss/index.htm>. Accessed October 20, 2011.
- StataCorp. *Stata Statistical Software: Release 12*. College Station, TX: StataCorp LP; 2011.
- Deputy NP, Boehmer U. Determinants of body weight among men of different sexual orientation. *Prev Med*. 2010;51(2):129-131.
- Bowen DJ, Balsam KF, Ender SR. A review of obesity issues in sexual minority women. *Obesity (Silver Spring)*. 2008;16(2):221-228.
- Beuther DA, Sutherland ER. Overweight, obesity, and incident asthma. *Am J Respir Crit Care Med*. 2007;175(7):661-666.
- Lee JG, Griffin GK, Melvin CL. Tobacco use among sexual minorities in the USA, 1987 to May 2007: a systematic review. *Tob Control*. 2009;18(4):275-282.
- McLeish AC, Zvolensky MJ. Asthma and cigarette smoking: a review of the empirical literature. *J Asthma*. 2010;47(4):345-361.
- Haczku A, Panettieri RA Jr. Social stress and asthma: the role of corticosteroid insensitivity. *J Allergy Clin Immunol*. 2010;125(3):550-558.
- Meyer IH. Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: conceptual issues and research evidence. *Psychol Bull*. 2003;129(5):674-697.
- Bossarte RM, Swahn MH, Choudhary E. The associations between area of residence, sexual violence victimization, and asthma episodes among US adult women in 14 states and territories, 2005-2007. *J Urban Health*. 2009;86(2):242-249.
- Swahn MH, Bossarte RM. The associations between victimization, feeling unsafe, and asthma episodes among US high-school students. *Am J Public Health*. 2006;96(5):802-804.
- Roberts AL, Austin SB, Corliss HL, Vander Morris AK, Koenen KC. Pervasive trauma exposure among US sexual orientation minority adults and risk of posttraumatic stress disorder. *Am J Public Health*. 2010;100(12):2433-2441.
- Mays VM, Cochran SD. Mental health correlates of perceived discrimination among lesbian, gay, and bisexual adults in the United States. *Am J Public Health*. 2001;91(11):1869-1876.