LGBT Health
Volume 2, Number 1, 2015

DOI: 10.1089/lgbt.2014.0038

Health Behaviors and Self-Reported Health Among Cancer Survivors by Sexual Orientation

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Abstract

Purpose: Health behaviors and self-reported health are important for understanding cancer survivor health. However, there is a paucity of published research about how cancer survivors' health behaviors and self-rated health vary by sexual orientation. This study examined cancer survivors' health behaviors and self-reported health by sexual orientation.
Methods: This study used data from the National Health and Nutrition Examination Survey (NHANES) from 2001–2010. Self-reported health and cancer-related health behaviors were compared by sexual orientation. Propensity score adjustment was used to account for differences in age, race, education, gender and health insurance status.
Results: Of the 602 survivors eligible for the study, 4.3% identified as sexual minorities. Sexual minorities were 2.6 times more likely to report a history of illicit drug use (adjusted odds ratio [aOR] = 2.4, 95% confidence interval [CI]: 1.04, 5.35), and 60% less likely to report their current health status as good (aOR = 0.40, 95% CI: 0.18, 0.89), compared to heterosexual cancer survivors. These disparities persisted even after adjustment for sociodemographic characteristics.
Conclusion: Our findings suggest that sexual minority cancer survivors may be at greater risk for poorer outcomes after cancer than other survivors. A possible explanation for the observed differences involves minority stress. Future research should test stress as an explanation for these differences. However, using population-methods to achieve this goal requires larger samples of lesbian, gay, and bisexual (LGB) cancer survivors.

Key words: cancer survivors, disparities, health behaviors, sexual orientation, self-rated health.

Introduction

Advances in cancer detection and treatment have resulted in a large and growing population of cancer survivors. Currently there are over 12 million cancer survivors living in the United States, and more than 60% of these survivors are living past the 5-year survival mark.[1] Good health, risk for recurrence, morbidity, and cancer-related mortality depend in part on survivors' cancer-related health behaviors including tobacco use, alcohol use, substance use, and physical activity.[2,3] Participation in cancer-related health behaviors is not the same across cancer survivors[4,5] and some subgroups of cancer survivors, including the medically underserved, are more likely to engage in cancer-related behaviors that promote risk for poor health, recurrence, and mortality.[6,7] Sexual minority cancer survivors, or those survivors who identify as, lesbian, gay or bisexual (LGB), may be one such group.[8,9]

Rigorous population-based studies have documented that LGB individuals are more likely to report poorer health, and greater prevalence of cancer-related risk behaviors such as alcohol use, tobacco use, and substance use, as heterosexuals.[10–13] If the poorer health and greater behavioral risks documented among LGBs persist after a cancer diagnosis and treatment, LGB survivors' could be at undue and elevated risk for poorer health, recurrence, second primary cancers, and cancer-related mortality.[14] Documenting LGB survivors' cancer-related health behavior is important for understanding cancer outcomes and for directing future intervention development and implementation targeted at LGB survivors, which could improve health and guard against recurrence and cancer-related mortality.

According to Gates (2011), LGB-identified persons make up approximately 3.5% of the U.S. population, meaning that there are approximately 420,000 sexual minority cancer survivors in the U.S.; most likely a conservative estimate, given

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recent reports suggesting sexual minorities bear a disproportionate burden of cancer and cancer-related risk. We have some preliminary evidence from state-level data that indicate differences in sexual minority cancer survivors' cancer-related health behaviors and self-rated health.[15–17] Three studies show sexual minority cancer survivors are more likely to be current smokers as compared to heterosexual cancer survivors.[15–17] Kamen and colleagues[16] reported sexual minority male cancer survivors drank alcohol on more days per week, consumed more drinks per day, and reported more drinks per 30 days than male heterosexual cancer survivors. In terms of self-rated health, sexual minority female cancer survivors were twice as likely to report fair/poor health compared to their heterosexual cancer survivor counterparts. Evidence for similar trends have been reported for male sexual minority cancer survivors. However, they have not reached the 0.05 level of significance.[15] Lesbian and bisexual female cancer survivors are less likely to report physical inactivity than heterosexual females. Conversely, gay and bisexual males are less likely to participate in vigorous physical activity compared to heterosexual male cancer survivors, but are less likely to be overweight.[15–17]

Given the health importance of cancer-related health behaviors among cancer survivors, the estimated size of the sexual minority cancer survivor population and previously published findings concerning sexual minority cancer survivors' cancer-related health behaviors and health status, there is a clear need to study this subgroup on a national scale. Yet, this subgroup remains largely understudied on any level, and research at the national level is almost non-existent. Previous research in this area has used state-level data and may reflect experiences that are unique to sexual minority cancer survivors residing in the particular state where the data were collected. Multiple Institute of Medicine (IOM) reports[8,18] have recommended that this type of gap should be filled by utilizing existing, national health surveillance data, that included sexual minority cancer survivors. However, the best possible source for national cancer surveillance data, the Surveillance, Epidemiology, and End Results (SEER) program of the National Cancer Institute, does not include sexual orientation,[19] and most other national health surveillance data sources that examine cancer survivorship do not include sexual orientation data. As such, this study aimed to further explore cancer-related health behaviors and self-reported health status among sexual minority cancer survivors using one of the few available data sets that includes a measure of both cancer survivorship and sexual minority status, the National Health and Nutrition Examination Survey (NHANES). As a survey designed to assess current health and nutritional status, the NHANES provides much less information about the role of sexual orientation on cancer survivorship than could be provided from SEER if it included sexual orientation data. However, the NHANES is currently the best national data available to explore issues of sexual minority status, cancer survivorship and health behaviors. Thus, the examination of this data fills a critical gap in the existing literature on sexual minority cancer survivorship.

Based on the previously published state-level evidence, we hypothesized that a larger proportion of sexual minority cancer survivors would report tobacco use, binge drinking, and history of substance use, as well as higher rates of physical activity, compared to heterosexual cancer survivors. We also hypothesized that a larger proportion of sexual minority cancer survivors would report fair/poor health compared to heterosexual cancer survivors.

Materials and Methods

Study sample

This study utilized publically available data from the NHANES, pooled from 2001–2010. The NHANES is a national health surveillance program that uses interviews, laboratory measures and physical exams to assess the health and nutrition of adults and children living in the United States. The NHANES surveys approximately 5,000 individuals from across the nation annually, and data can be combined across years to provide adequate sample size for studying small population groups. More detailed information regarding the NHANES design and sampling strategies are described elsewhere.[20] The current study is based on a sample of 602 self-identified cancer survivors who participated in the NHANES from 2001–2010, were eligible for the sexual behavior interview, and identified their sexual orientation.

Measures

Sexual orientation

Sexual orientation was measured with a single question asking participants to identify themselves as either ''Heterosexual or straight,'' ''Homosexual or Gay/Lesbian,'' ''Bisexual,'' ''Something else,'' or ''Not sure.'' Cancer survivors who identified as ''Homosexual or Gay/Lesbian,'' ''Bisexual,'' or ''Something else,'' were considered sexual minorities. Survivors who indicated ''Not sure'' were not included as sexual minorities, as the meaning of ''Not sure'' could not be reasonably inferred as non-heterosexual. Survivors who indicated ''Something else'' were included in the sexual minority group because ''Something else'' indicated identification with a sexual orientation other than heterosexual.

Cancer-related health behaviors and self-reported health

We examined cancer survivors' self-reported health status and several cancer-related health behaviors including current smoking, binge drinking within the past 12 months, lifetime binge drinking, history of hard drug use, marijuana use, physical activity in the past 30 days, and moderate physical activity in the past 30 days. Participants were classified as ''current smokers'' if they answered either ''Some days'' or ''Every day'' to the question, ''Do you now smoke cigarettes?'' Participants were considered to have a history of hard drug use if they answered yes to the question, ''Have you ever used cocaine, including crack or freebase, or other street drugs? Do not include marijuana,'' if surveyed in the years 2001–2004 or if they answered yes to the question ''Have you ever used cocaine, crack cocaine, heroin, or methamphetamine?'' if surveyed in the years 2005–2010. Lifetime history of marijuana use was measured with a single question, ''Have you ever used marijuana or hashish?'' Current binge drinking was assessed with the question, ''In the past 12 months, on how many days did you have 5 or more drinks of any alcoholic beverage?'' Lifetime binge drinking was assessed with the question, ''Was there ever a time or times in your life when you drank 5 or more drinks of any

kind of alcoholic beverage almost every day?'' Survivors were considered to have had vigorous physical activity if they had engaged in at least 10 minutes of non-work or transportation related vigorous activity in the past 30 days. Survivors were considered to have had moderate physical activity if they had engaged in at least 10 minutes of non-work or transportation related moderate physical activity in the past 30 days, but did not engage in any vigorous activity. Self-rated health was measured with a single question, ''Would you say your health in general is excellent, very good, good, fair, or poor?'' Responses indicating good or better health were coded ''good health'' and fair and poor were coded ''poor health.''

Demographic characteristics

Cancer survivors' age, race/ethnicity, gender, education, income, and health insurance status were assessed.

Analysis

Demographic characteristics, cancer-related health behaviors, and self-reported health were compared by sexual minority status using the chi-square test for proportions and the student's t-test for continuous variables. Logistic regression was used to calculate unadjusted and adjusted odds ratios (aORs) for engaging in cancer-related health behaviors and reporting good health for sexual minorities as compared to heterosexuals. Propensity score adjustment was used to account for the effects of age, race/ethnicity, education, gender and health insurance status.[21] For this adjustment, a propensity score was derived for each participant by calculating the predicted probability of being a sexual minority from a logistic model containing age, race/ethnicity, education, gender and health insurance status. This propensity score was then included as an adjustment variable in logistic models predicting engagement in cancer-related health behaviors and self-reported good health from sexual orientation. Propensity score adjustment was chosen rather than traditional adjustment with multivariable logistic regression to control for differences between the groups, as it can be a more robust method with smaller samples.[21] All analyses were conducted with SAS 9.3.[22]

Results

Table 1 provides a summary of the demographic characteristics of survivors by sexual orientation. Of the 602 survivors, 4.3% ($n=26$) identified as sexual minorities and 95.7% ($n=576$) identified as heterosexual. Of those who identified as sexual minorities 7% ($n=2$) identified as lesbian, 12% ($n=3$) identified as gay, and 62% ($n=16$) identified as bisexual, and 19% ($n=5$) identified as ''Something else.'' Thirty-four percent of those who identified as bisexual were female ($n=9$) and 12% of the group identifying as ''Something else'' were female ($n=3$). Sexual minority survivors were significantly ($P<.05$) more likely to be younger (40.9 vs. 46.) and have lower incomes than their heterosexual counterparts. There was a marginally significant ($P=.06$) difference for gender such that sexual minority survivors were more likely to be male (46.2 vs. 29.2). No differences were found in regards to race/ethnicity, education or health insurance status.

Table 1. Demographic Characteristics of Cancer Survivors in the NHANES from 2001 to 2010 by Sexual Orientation

Characteristic	*Heterosexual* (n = *576*)	*Sexual Minority* (n = *26*)	P-*Value*
	% or Mean (SD)		
Age	46.0 (10.1)	40.9 (11.3)	0.013
Race			0.412
Non-Hispanic White	72.4	61.5	
Non-Hispanic Black	11.6	19.2	
Other	16	19.2	
Gender			0.064
Male	29.2	46.2	
Female	70.8	53.8	
Education			0.687
Less than High School	17.5	23.1	
High School	25.2	15.4	
Some College	32.8	34.6	
College Graduate or Above	24.5	26.9	
Income*			0.029
Less than $25,000	34.6	37.5	
$25,000–$34,999	10.8	29.2	
$35,000–$49,999	7.9	8.3	
$45,000 or greater	46.7	25	
Have Health Insurance			0.134
Yes	84.2	73.1	
No	15.8	26.9	

*133 observations were missing data.
NHANES, National Health and Nutrition Examination Survey.

Cancer-related health behaviors and self-reported health by sexual orientation are presented in Table 2. Compared to heterosexuals, sexual minority participants were significantly ($P<.05$) more likely to report a history of illicit drug use (42.3% vs. 22.0%) and less likely to report their health status as good (53.8% vs. 73.1%). There was a marginally significant ($P=.06$) difference for current smoking, with 46.2% of sexual minority participants reporting that they currently smoke versus 28.8% for heterosexuals.

Table 3 provides unadjusted and aOR's for cancer-related health behaviors and self-reported health along with their 95% confidence intervals. After adjustment, sexual minorities were over two and a half times more likely to report a history of illicit drug use (aOR = 2.4, 95% confidence interval (CI): 1.04, 5.35), and were 60% less likely to report their current health status as good (aOR = 0.40, 95% [CI]: 0.18, 0.89) compared to heterosexuals. There remained a marginally ($P=.07$) significant difference for current smoking status, with sexual minority survivors being over twice as likely to report current smoking (aOR = 2.1, 95% CI: 0.94, 4.68).

Discussion

Our findings indicate that disparities in certain cancer-related health behaviors exist for sexual minority survivors, even after adjustment for important socio-demographic characteristics. We hypothesized that a larger proportion of

Table 2. Cancer Survivor Health-Related Behaviors and Self-Reported Health by Sexual Orientation

Characteristic	*Heterosexual* (n = *576*)	*Sexual Minority* (n = *26*)	P-*Value*
	% or Mean (SD)		
Current Smoker			0.058
Yes	28.8	46.2	
No	71.2	53.8	
Binge Drinking w/in Last 12 Months			0.103
Yes	18.1	30.8	
No	81.9	69.2	
Lifetime Period of Binge Drinking			0.153
Yes	17.29	31.2	
No	82.71	68.8	
History of Hard Drug Use			**0.016**
Yes	22	42.3	
No	78	57.7	
Current Self-Reported Good Health			**0.032**
Yes	73.1	53.8	
No	26.9	46.2	
Vigorous Activity in Last 30 Days			0.22
Yes	35.26	47.83	
No	64.74	52.17	
Moderate Activity in Last 30 Days			0.686
Yes	47.86	52.17	
No	52.14	47.83	

Boldface values reflect statistical significance $< .05$.

Table 3. Odds of Good Health and Health-Related Behaviors Among Sexual Minority Cancer Survivors

Characteristic	*aOR*	*95% CI*
Current Smoker		
Unadjusted	2.117	(0.959, 4.674)
Adjusted*	2.095	(0.938, 4.679)
Binge Drinking w/in Last 12 months		
Unadjusted	2.017	(0.854, 4.764)
Adjusted	1.758	(0.732, 4.224)
Lifetime Period of Binge Drinking		
Unadjusted	2.174	(0.732, 6.456)
Adjusted	1.949	(0.648, 5.862)
History of Hard Drug Use		
Unadjusted	2.607	(1.168, 5.819)
Adjusted**	2.364	(1.043, 5.354)
Current Self-Reported Good Health		
Unadjusted	0.429	(0.194, 0.949)
Adjusted**	0.396	(0.176, 0.890)
Vigorous Activity in Last 30 Days		
Unadjusted	1.683	(0.514, 2.747)
Adjusted	1.615	(0.686, 3.806)
Moderate Activity in Last 30 Days		
Unadjusted	1.188	(0.514, 2.747)
Adjusted	1.139	(0.485, 2.677)

*$P = .07$.
**$P < .05$.
CI, confidence interval; aOR, adjusted odds ratio.

sexual minority cancer survivors would report tobacco use, binge drinking, history of substance use, and higher rates of physical activity. We also hypothesized that sexual minority cancer survivors would be less likely to report good health. Our hypotheses were partially supported; sexual minority cancer survivors were more likely to report a history of hard drug use and were significantly less likely to report good health. We also found trends that sexual minorities were more likely to be current smokers than heterosexual cancer survivors, although this did not reach the .05 level of significance. Our tobacco finding is also similar the findings reported by others.[16,17] These findings are similar to those reported by Boehmer and colleagues;[17] in both studies sexual minority cancer survivors were more likely to report poorer self-rated health and tobacco use than heterosexual cancer survivors. We had also hypothesized that a greater proportion of sexual minority cancer survivors would report binge drinking and participation in physical activity compared to heterosexual cancer survivors. This finding trended toward the hypothesized direction but did not achieve the .05 level of significance. Our findings are consonant with Boehmer and colleagues'[17] report on alcohol consumption and moderate physical activity among sexual minority cancer survivors. It is possible that the sample size in our study was too small to detect differences in these variables at the .05 level of significance. It is also possible that cancer survivors' binge drinking and physical activity are not significantly different. However, we suspect that combining all sexual minorities into one heterogeneous category reduced our ability to detect the differences documented by others. For example, Boehmer[17] found that bisexual female cancer survivors were 60% less likely to be inactive, and bisexual men were three times more likely to participate in vigorous physical activity relative to heterosexual cancer survivors. In order to thoroughly understand sexual minority cancer survivors' health and health behaviors, oversampling of survivors and sexual minorities in health surveillance is required.

We have presented new findings: Sexual minority cancer survivors in our sample were more likely to report a history of substance use. Taken together with our previously discussed findings, it seems that disparities in cancer-related health behaviors may exist among sexual minorities. The fact that such pronounced differences were identified in this sample, especially given our relatively small sample of sexual minorities, indicates this population is in need of further study.

Sexual minorities, as a subgroup of cancer survivors, may be at greater risk for poorer outcomes after cancer than other survivors. A possible explanation for the observed differences involves minority stress.[23] Minority stress involves the chronic distal and proximal stressors associated with living as a sexual minority in a hetero-dominate culture. Meyer[24] describes distal stressors as prejudiced events, violence, and proximal stressors as the expectation of rejection, internalized homophobia, and concealment. Sexual minority people experience minority stress in addition to daily hassles experienced by every person. Minority stressors influence sexual minorities' health by negatively impacting psychological processes including coping and emotion regulation, social/interpersonal processes, and cognitive processes.[24] The minority stressors experienced by sexual minorities before cancer diagnosis and treatment may result in tobacco and

other substance use as a coping strategy. Cancer treatment itself is stressful and because minority stress occurs in addition to daily hassles and stressful life events, it is also possible that after cancer, sexual minority cancer survivors' cope with elevated stress by initiating or continuing tobacco and substance use. It is possible that the elevated rates of tobacco and substance use represent coping strategies for managing exposure to minority stress. Exposure to minority stress may also explain the disparity observed in sexual minority cancer survivor's self-rated health. Exposure to minority stress and diminished psychological processes may contribute to disparities in self-rated health among sexual minority cancer survivors. Chronic stress, like minority stress, negatively impacts health through over-activation of biological systems.[25] Over-activated biological systems can produce deleterious health effects that make individuals more likely to feel poorly and report poorer self-rated health. Chronic stress also drives behavioral responses including health behaviors such as tobacco and substance use. Tobacco and substance use are associated with poorer self-rated health.[26,27] To inform this idea, future studies should empirically and rigorously test minority stress as a possible mediator of cancer-related health behaviors and health outcomes among sexual minority cancer survivors.

Our findings, and others', may also have clinical implications. Although sexual minorities are a heterogeneous group with different needs, concerns, and characteristics, sexual minority cancer survivors, as all cancer survivors, require follow-up and primary care after cancer. Follow-up and primary care present unique opportunities for healthcare providers to reach sexual minority cancer survivors who may need clinical support and/or referrals for assistance with substance and alcohol use, and/or tobacco cessation. For example, the Institute of Medicine's report, *From Cancer Patient to Cancer Survivor: Lost in Transition*, recommends that every cancer survivor receive a survivorship care plan that will direct the cancer survivor and primary care provider to the specific follow-up and primary care that is needed after cancer treatment is completed.[18] Survivorship care plans provide specific information to the survivor and primary care provider concerning the cancer diagnosis, staging, and treatment, including instructions for follow-up care and risk for late and long term effects.[28] It is also expected that care plans include material concerning psychosocial issues and behavioral health topics such as smoking cessation and substance use. Survivorship care plans could therefore be used as a strategy to provide sexual minority cancer survivors and their providers with important information concerning the deleterious effects of substance and tobacco use after cancer and provide referrals to high quality resources for cessation and support. We also recommend that providers become aware of the possibility that sexual minority cancer survivors may exist in their practices, and their possible need for clinical support and/or referrals during follow-up and primary care visits. In the case that a provider is unable or not comfortable providing appropriate clinical services for these health topics, providers should have culturally relevant referral sources available for distribution.

This study had several limitations. Foremost is the very small sample of sexual minority cancer survivors available in the NHANES due to the lack of sexual orientation assessment for NHANES participants over age 59 in the years 2001–2006 and over age 69 after 2006. Although, the percentage of sexual minority cancer survivors (4.3%) is larger than would be expected based on previous studies using the NHANES.[29,30] The small number ($n = 26$) of sexual minority cancer survivors limited our ability to test for meaningful comparisons in types of cancer experienced by sexual minority compared to heterosexual cancer survivors. Our small sample size also may have limited our power to detect statistically significant differences in health behaviors between sexual minority and heterosexual cancer survivors. This lack of power is particularly problematic for those outcomes where the magnitude of the health disparity is smaller between the two groups. Post-hoc power analyses revealed our power ranged from a low of 6.2% for moderate physical activity to a high of 66.0% for self-reported good health. Sexual minorities do not represent a single homogenous group and there is evidence that risk varies across sexual orientation categories.[31,32] In the current study, bisexually identified individuals characterized 62% of the sexual minority group and therefore findings may be more reflective of experiences of bisexual cancer survivors than other sexual minorities. Future work with larger samples of sexual minority cancer survivors may reveal statistically significant differences in health behaviors that we were unable to detect in our study. Moreover, our study illustrates the need to collect sexual orientation data in the national SEER cancer registry. Additionally, very little is known about the subgroup of cancer survivors who identified as ''Something else.'' The individuals who identified as ''Something else'' were included as sexual minorities in this study because identifying as ''Something else'' indicates that these individuals may identify with a sexual orientation other than heterosexual. Identifying as anything outside the heterosexual norm may result in the marginalization and exposure to the minority stressors that are thought to underlie the behavioral risk reported by this study. Health surveillance programs regularly include ''Something else'' as a response option for sexual orientation.[34] However, in many published health surveillance reports individuals who identify as ''Something else'' are dropped from analyses due to ambiguity.[29,30] Consequently there is almost no published evidence to elucidate the characteristics of this group. One hypothesize is that these individuals could belong to socio-cultural groups that do not agree with or identify with gay, lesbian, or bisexual identity labels, despite being same-sex attracted and engaging in same-sex romantic relationships. It is also possible that individuals who identify as ''Something else'' did not understand the meaning of the sexual orientation question and response options used by NHANES. Next to nothing is known about the health and risk patterns of those who identify with the ''Something else'' category and future investigations should carefully examine the characteristics of individuals who make up this group so that we can better understand the distribution of risk.

The young age of the cancer survivors that make up this sample is also a limitation. Heterosexual cancer survivors in this sample were on average 46 years of age, and sexual minority cancer survivors were 41 years of age. These ages are considerably younger than population estimates where almost half (45%) of cancer survivors were 70 years of age or older.[34] The NHANES sampling design for the sexual behavior questionnaire required that our analyses were age-restricted. However,

the cancer-related behaviors examined in this study are particularly important for young cancer survivors. Theoretically, this younger group is likely to be healthier in regards to co-morbid conditions and would likely experience the greatest gains in cancer-free survival time with appropriate intervention. Our inability to test for gender differences among sexual minority cancer survivors is also a significant study limitation. Marital status and long-term partnership status are important psychosocial factors in health and survivorship. Unfortunately the NHANES does not collect long-term partnership status for sexual minorities and due to lack of marriage equality across the United States the marital status demographic variable cannot be used to denote spousal partnerships among sexual minorities in this study. Consequently we were not able to determine how health and health behaviors differed by marital status and long-term partnerships in this study. Yet, despite these limitations, our findings are consonant with the existing evidence that sexual minority cancer survivors are more likely to report fair/poor health and current smoking than heterosexual cancer survivors.[15,17] We also have added to the previously published work with our finding that sexual minority cancer survivors were more likely to have a history of hard drug use than heterosexual cancer survivors. The cross-sectional study design is also a limitation. The design does not permit examination of the temporal relationships between cancer survivors' health and health-related behavior before and after cancer.

Although a probability-based sample was used in this study, the analyses were unweighted, as the NHANES was not designed to generate population estimates for this small subsample. This approach has been used by others to investigate small subgroups of cancer survivors[35] using probability-based health surveillance programs, per guidance from the Centers for Disease Control and Prevention (CDC) on using small subgroups of respondents ($n = < 50$);[36] however, it does not account for potential differences that may have resulted from survey design characteristics. At present, this is one of the few strategies available for investigating health behaviors and health among small subgroups, such as sexual minority cancer survivors, in population-based surveys. Both administration of sexual behavior and orientation questions to older adults and oversampling of sexual minorities are needed in future national health surveys in order to better investigate health disparities in this subgroup and to provide stable population estimates for this group.

Despite sample size constraints, our findings are concordant with the previous state-based findings that report on sexual minority cancer survivors. This concordance lends credibility to the idea that disparities exist in health and health behaviors among LGB cancer survivors at the national level.[17] Notwithstanding the limitations, this study makes the case for future investigation into how healthcare providers and healthcare organizations can better assist sexual minority cancer survivors in achieving cancer-related behavior and health outcomes that are equal to heterosexual cancer survivors.

Acknowledgments

This work was supported by the American Cancer Society Post Doctoral Fellowship Grant #PFT-10-111-01-CPPB (Jabson), a Pre-Doctoral NRSA National Institute on Drug Abuse Fellowship (Grant #1F31DA032220-01), and the National Cancer Institute (Grant #U54CA155496) (Farmer). The authors would like to acknowledge the Mentoring Program of The Center for Population Research in LGBT Health, supported by the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (Grant #R21HD051178).

Author Disclosure Statement

No competing financial interests exist.

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