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Physical and Mental Health Status and Health Behaviors of Childhood Cancer Survivors: Findings from the 2009 BRFSS Survey

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Abstract

Background—The growing number of childhood cancer survivors makes examination of their current physical and mental health status and health behaviors an important concern. Much of what is known about the long-term outcomes of childhood cancer survivors comes from the Childhood Cancer Cohort Study (CCSS) which uses sibling controls.

Procedure—Using data from the 2009 Behavioral Risk Factor Surveillance System survey, 651 childhood cancer survivors and 142,932 non-cancer peer controls were identified. The two groups were compared on a variety of physical and mental health status and health behavior variables using ANCOVA and binary logistic regression.

Results—While controlling for differences in age, sex, and minority status, survivors significantly ($p = 0.001$) had poorer socioeconomic outcomes, more comorbid conditions, lower life satisfaction, less social and emotional support, poorer general health, and reported more days per month of poor physical and mental health than non-cancer individuals. Survivors were more likely to report being a current smoker (odds ratio [OR] = 2.33; 95% confidence interval [CI], 1.98 to 2.73; $p < 0.001$); tested for human immunodeficiency virus (HIV) (OR = 1.79; 95% CI, 1.52 to 2.11; $p < 0.001$); and that at least one HIV situation applied to them (OR = 2.06; 95% CI, 1.55 to 2.74; $p < 0.001$). No significant differences were found between groups in regards alcohol use and diet.

Conclusions—Results support and extend previous findings reported by the CCSS. New findings regarding survivors' increased likelihood to engage in risky behaviors proposes new directions for future research.

Keywords

childhood cancer survivors; physical health; mental health; health behaviors

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INTRODUCTION

Advances in the treatment of childhood cancers have resulted in a dramatic decline in childhood cancer mortality over the past 25 years [1, 2]. This has resulted in a growing number of childhood cancer survivors in the United States, estimated to be well over 300,000 [3]. Improved survival has been accompanied by an increased interest in examining the presence of late effects of diagnosis and treatment that span into adulthood as well as health behaviors that may modify the risk for these late effects [4–9].

Much of what is known about the long-term status of childhood cancer survivors comes from the Childhood Cancer Survivor Study (CCSS) [10], a cohort of more than 14,000 childhood cancer survivors and 3,700 siblings controls recruited from 26 institutions across the United States. In general, the CCSS has established childhood cancer survivors to be at greater risk for poorer socioeconomic outcomes [11], more chronic health conditions [12, 13], poorer physical and mental health [14, 15], and being physically inactive [16]. Rates of tobacco and alcohol use, while higher than optimal given survivors' increased risk for cardiac, pulmonary, and metabolic late effects, are nevertheless generally equal to or lower than sibling controls or general population rates [6].

While the CCSS has advanced the knowledge of the impact of childhood cancer greatly, it does possess some limitations. The CCSS sample is not population-based but is limited to survivors who received treatment at 26 academic institutions. Furthermore, while the use of sibling controls can be an advantage when examining some outcomes, it can be a disadvantage for others. For example, there is evidence siblings of childhood cancer survivors also endure psychosocial challenges because of the cancer experience [17, 18], thus making use of healthy, non-cancer peer controls a better comparison for some outcomes. The lack of population-based samples and healthy, non-cancer control groups are weaknesses of the larger childhood cancer survivor literature as well [4, 7].

The Institute of Medicine [19] has recommended the use of national household and health care surveys to help identify the medical, functional, and psychosocial consequences of cancer and its treatment. The present study embraces this recommendation and complements and extends the CCSS by examining a spectrum of current physical and mental outcomes and health behaviors of childhood cancer survivors and healthy, non-cancer peer controls using the 2009 national, population-based Behavioral Risk Factor Surveillance System (BRFSS) survey.

METHODS

Data were obtained from the 2009 BRFSS survey. The BRFSS is an annual national computer-assisted telephone survey, coordinated by the Centers for Disease Control and Prevention, used to track health conditions and risk behaviors (<http://www.cdc.gov/brfss>). The BRFSS consists of core questions completed by all respondents and a set of question modules completed only by respondents from a subset of states and territories. Random-digit dialing is used to survey non-institutionalized adults (≥ 18 years old). For the 2009 BRFSS survey, full or partial interviews were completed by 432,607 respondents; the median Council of American Survey Research Organizations (CASRO) response rate was 52.5% while the median cooperation rate was 75.0% [20].

2009 BRFSS Cancer Survivor Questions

The 2009 BRFSS core survey included a set of questions designed to identify cancer survivors. Respondents were asked “Have you ever been told by a doctor, nurse, or other health professional that you had cancer?” Respondents who answered “yes” were asked

additional questions to determine: how many times they had been diagnosed with cancer; their age at initial diagnosis; and the type of cancer they were diagnosed with. The wording and response alternatives can be found at <http://www.cdc.gov/brfss>.

2009 BRFSS Core Survey Questions

Demographic Variables—Information regarding current age, sex, race/ethnicity, marital status, education, annual household income, and employment status was obtained.

Physical and Mental Health Status—Personal history of eight comorbid conditions was assessed by asking respondents: “Has a doctor, nurse, or other health professional ever told you that you had any of the following?” (yes vs. no). Specific comorbid conditions queried included diabetes, high blood pressure, high cholesterol, heart attack, angina/coronary heart disease, stroke, asthma, and arthritis. The number of affirmative responses to this list was summed to create an index of personal history of comorbid conditions (range 0–8).

Current life satisfaction was rated on a 4-point scale ranging from “very satisfied” to “very dissatisfied.” Received social and emotional support was rated on a 5-point scale ranging from “always” to “never.” Current general health was rated on a 5-point scale ranging from “excellent” to “poor.” Respondents provided separate indications of the number of days during the past month when: (1) their physical health was not good; (2) their mental health was not good; and (3) they did not get enough rest or sleep. Respondents were asked whether their activities were limited in any way because of physical, mental, or emotional problems (yes vs. no). Lastly, current height and weight was obtained to calculate body mass index (BMI). Obesity was defined as BMI ≥ 30 .

Health Behaviors—Current alcohol use was assessed. Respondents were asked whether they had consumed at least one alcoholic beverage in the past month. If “yes”, respondents were asked the number of days per week or month they had consumed alcohol and the average number of drinks consumed on each drinking occasion. Responses to these two questions were used to calculate the total number of drinks consumed during the past month. Respondents were also asked the number of times during the past month they had consumed five or more drinks on one occasion. Those acknowledging consuming five or more drinks on at least one occasion during the past month were considered to have evidenced a binge-drinking episode.

Current tobacco use was assessed. Respondents were asked whether they had smoked at least 100 cigarettes in their life. Those indicating “yes” were asked whether they were now smoking cigarettes “every day”, “some days” or “not at all”. Responses were used to classify respondents as current cigarette smokers (every day or some days) or non-smokers (not at all). Respondents were asked whether they currently used any smokeless tobacco products. Those responding they used smokeless tobacco products “every day” or “some days” were classified as smokeless tobacco users.

Current fruit and vegetable consumption was assessed. Six separate questions were used to identify how often respondents consumed fruit juice, fruit, green salad, potatoes, carrots, and vegetables (other than potatoes, carrots and salad). Responses to these questions were then used to determine the typical number of servings of fruits and vegetables consumed per day and those acknowledging consuming five or more servings per day.

Current physical activity was assessed. Participation in any leisure-time exercise was assessed by asking respondents whether, other than their regular job, they had participated in the past month in any physical activities or exercises such as running, golf, walking,

calisthenics, or gardening for exercise (yes vs. no). Respondents were also asked whether in a usual week they engaged in moderate physical activity for at least 10 minutes at a time when they were not working (yes vs. no). Those responding “yes” were then asked how many days per week they engaged in moderate physical exercise at least 10 minutes at a time and, on these days, how many total minutes they spent per day engaging in these moderate physical activities. Responses to these latter questions were used to calculate the total minutes a respondent engaged in moderate physical activity (outside their job) during a typical week. A parallel set of questions was used to similarly identify the total minutes a respondent engaged in vigorous physical activity (outside their job) during a typical week.

Human immunodeficiency virus (HIV)-related behaviors were assessed. Respondents were asked if they had ever been tested for HIV (yes vs. no). Respondents were also asked to respond (yes vs. no) if at least one of four risky HIV-related situations ever applied to them (e.g., “You have: (1) used intravenous drugs in the past year; (2) been treated for a sexually transmitted or venereal disease in the past year; (3) given or received money or drugs in exchange for sex in the past year; (4) had anal sex without a condom in the past year”).

Identification of Childhood Cancer Survivor Cases and Non-Cancer Controls

In the 2009 BRFSS survey, 1403 respondents indicated they had been told by a health professional they had cancer at 20 years of age. To be included in the cases of childhood cancer survivors (Survivor group), the respondent also had to: (1) have a single lifetime cancer diagnosis within the past 30 years; and (2) be 50 years old. A total of 651 respondents met inclusion criteria and were considered the Survivor group. Non-cancer controls were identified from among remaining BRFSS respondents (Control group). To be included in the Control group, a respondent had to: (1) report no prior lifetime history of cancer diagnosis; and (2) be 50 years old. A total of 142,932 respondents constituted the Control group.

Statistical Analyses

Prior to performing primary study analyses, the Survivor and Control groups were compared with regard to age, sex, minority status, marital status, education, annual household income, and employment status, using chi-square and t-test analyses as appropriate (Table I). Significant differences were found between the two groups with regard to age, sex, and minority status and these variables were used as covariates in the primary study analyses. Marital status, education, income, and employment status were dichotomized and used as socioeconomic outcome variables in the primary analyses.

For the primary study analyses, analysis of covariance was used to compare the Survivor and Control groups on outcome variables. Effect size (ES) for the difference between these two groups on continuous outcome variables were calculated as the difference between the two groups' means divided by the pooled standard deviation (SD) for the entire sample. Binary logistic regression compared the two groups on dichotomous outcome variables, while controlling for covariates. In the logistic analyses, the Control group was used as the reference group and 95% confidence intervals (CI) were calculated for all odds ratios (OR). Statistical analyses were performed using SPSS - criterion for statistical significance was .05.

RESULTS

For the Survivor group, mean time-since-diagnosis was 17.1 years (SD = 8.1 years, range 0–30). Table II displays the types of cancer diagnoses.

Table III compares the Survivor and Control groups on socioeconomic outcome variables. The Survivor group was less likely to have a college degree, be married or partnered, and employed for wages or self-employed and they were more likely to have an annual household income < \$20,000 (all p's < 0.001)

Table IV compares the Survivor and Control groups on personal history of eight comorbid conditions. The Survivor group was more likely to report a history of all eight conditions (all p's < 0.001) with OR's ranging from 1.44 (high blood pressure) to 5.15 (heart attack).

Table V compares the Survivor and Control groups on current physical and mental health status variables. The Survivor group reported poorer life satisfaction (ES = 0.32 SD; p<0.001), less social and emotional support (ES = 0.23 SD; p<0.001), and poorer general health (ES = 0.52 SD; p<0.001). The Survivor group also reported more days in the past month when their physical (ES = 0.52 SD; p<0.001) and mental health (ES = 0.50 SD; p<0.001) were not good and more days of not having enough rest or sleep (ES = 0.32 SD; p<0.001). Lastly, the Survivor group reported a greater personal history of comorbid conditions (ES = 0.42 SD; p<0.001).

The Survivor group (32.3%) was more likely than the Control group (15%) to report activity limitations due to physical, mental, or emotional problems (OR=3.21; 95% CI, 2.71 to 3.79; p<0.001). No difference was found in the proportion of respondents meeting BMI criteria for obesity between the Survivor (28.0%) and Control (28.6%) groups (OR=1.09; p=0.33).

Comparison of the Survivor and Control groups on health behaviors are shown in Supplement Table I and Table VI. No differences were found between the two groups in the mean number of alcoholic beverages consumed per month or the proportion who had consumed an alcoholic beverage or evidenced a binge-drinking episode in the past month. While no difference was found in the proportion of smokeless tobacco users, the Survivor group was more likely to report being a current cigarette smoker than the Control group (37.1% vs. 20.5%; OR=2.33; p<0.001). No difference was found between the two groups on mean number of servings of fruits and vegetables consumed per day or the proportion reporting consumption of 5 or more servings of fruits and vegetables per day. Finally, while the Survivor group was less likely than the Control group to engage in any leisure-time activity in the past month (73.3% vs. 77.9%; OR=0.73; p<0.001), among those who did report physical activity, the Survivor group reported more minutes of moderate physical activity per week than the Control group (M = 345.9 vs. M = 273.8; p<0.001). No differences were found for the other physical activity indices.

Regarding HIV-related behaviors, the Survivor group was more likely than the Control group to report being tested for HIV (64.2% vs. 47.6%; OR=1.79; p<0.001) and acknowledging at least one HIV-related high risk situation applied to them (8.3% vs. 3.7%; OR=2.06; p<0.001).

DISCUSSION

Findings replicate much of what is already known about childhood cancer survivors. Similar to prior research [12, 21–29], we found survivors reported poorer socioeconomic outcomes and more deficits in their physical health status. We also found no differences between survivors and controls with regard to diet and alcohol-related behaviors and only a couple of small differences with regard to activity level, which mirrors the conclusion survivors are similar to the general population with regard to diet, alcohol use, and physical activity [4, 6, 7]. While similar to previous research, our results are based on survivors identified in a national, population-based survey, as opposed to survivors treated at a limited number of academic institutions, with comparison to healthy, non-cancer peer controls (as opposed to

sibling controls or population norms). Thus, our findings methodologically complement and extend those previously reported by the CCSS and others.

Our findings also substantively diverge from or add to previous research. With regard to mental health status, we found survivors reported less social and emotional support and poorer life satisfaction. While perceptions of social and emotional support were not examined in the CCSS, Zeltzer et al. [30] found no differences in life satisfaction between survivors and sibling controls. With regard to physical comorbidities, our data suggest survivors were more likely than controls to report asthma (24.7% vs. 14%) and arthritis (26.7% vs. 16.2%). While some previous research suggests survivors are at an increased risk for pulmonary complications (e.g., lung fibrosis, recurrent pneumonia, chronic cough) [31] and major joint replacement than sibling controls [12], there is a general paucity of research on asthma and arthritis risk in childhood cancer survivors. Thus, more research is needed to clarify our findings.

Perhaps the most significant area of divergence from previous research lies in our finding of a higher current smoking rate in Survivors (37.1%) relative to Controls (20.5%). This finding is in contrast to the reported smoking prevalence rates in childhood cancer survivors of 17% [32] and 28.6% [33] and several reviews which have concluded survivors are generally no more likely to smoke relative to either peers or population norms [4, 6, 7]. Survivors in this study were up to 30 years post-diagnosis and up to 50 years of age. Prior research focusing on much younger and more recently diagnosed survivors may yield lower survivor smoking rates [4]. Given the significant risk for increased morbidity and mortality associated with smoking in cancer survivors [6], it may be dangerously premature to conclude childhood cancer is not associated with an elevated risk of smoking in adulthood.

Higher smoking rates also dovetail with our novel finding that survivors were more likely than controls to report engaging in risky, HIV-related behaviors. While risky behaviors in childhood cancer survivors has received only scant attention, initial results have suggested generally less risk for illegal drug use or unprotected sex among survivors relative to sibling and peer controls [4]. Coupled with our results for current smoking, results from this study contrast with prior research in suggesting a pattern of *riskier* tobacco-, drug-, and sexually-related behaviors among childhood cancer survivors. While provocative, these findings must be viewed with caution. Future research should focus more explicitly on these and other potentially risky behaviors in childhood cancer survivors and examine attitudes, beliefs, and motivations linked to these behaviors.

Differences found between the two groups appear to be both statistically and clinically significant. For example, in Table V, seven of the variables for which significant group differences were found, ES's ranged from 0.23 SD to 0.52 SD with a mean ES of 0.40 SD. ES's in the range of 0.30 to .50 SD can be interpreted as clinically important or meaningful [34–36]. Likewise, the OR's for the differences reported in Tables III, IV, and VI ranged from less than 1 (0.61 to 0.77) or greater than 1 (1.44 to 5.15). Thus, in general, the observed group differences are clinically meaningful and relevant.

This study is not without limitations. First, because the BRFSS survey includes only respondents with household telephones, individuals without a phone were not represented in either of our study groups. Second, while the CASRO survey response rate of 52.5% in the 2009 survey is consistent with recent annual BRFSS surveys, this response rate nevertheless raises some question regarding the overall representativeness of our study groups. Third, in comparison to other childhood cancer survivor studies, the sample size of our Survivor group is rather small and the distribution of cancer diagnoses is different. This limitation is inherent in the fact personal history of cancer was assessed by self report versus medical

records. However, self reports of a cancer diagnosis are commonly used in population-based research to identify cancer survivors [29, 37–39]. A potential explanation for the high number of cervical cancer cases may be because many adolescents were inappropriately screened and treated for cervical cancer prior to recent changes in cervical cancer screening [40]. While the accuracy of self reports of a lifetime cancer diagnosis and the type of cancer diagnosed is generally high [41, 42], the possibility for some degree of misclassification in our Survivor and Control groups must be considered.

In summary, research from cohort studies such as the CCSS and now this study are forging a fairly consistent picture of the potential negative impact of childhood cancer on mental and physical health status. Most illustrative of this is our finding that survivors reported more days per month of poor physical and mental health than did their peers. Potentially new findings emerged from this study as well. In particular, our results suggested the childhood cancer experience might increase the likelihood of certain “risky” behaviors. The challenge for future research is to continue to refine our risk prediction models to identify childhood cancer survivors at more or less risk for specific unhealthy outcomes and behaviors and translate this knowledge into the clinical practice.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1
Comparison of Survivors and Control Groups with Regard to Demographic Variables

Variable	Survivor	Control	p-value
Current age	$\bar{M} = 33.49$ yrs SD = 8.36 yrs	$\bar{M} = 38.27$ yrs SD = 8.64 yrs	<0.001
Sex			<0.001
(n, % Female)	(n = 529; 81.3%)	(n = 86,467; 60.5%)	
Race/Ethnicity			0.006
(n, % White, non-hispanic)	(n = 502; 77.5%)	(n = 103,086; 72.6%)	
Marital Status			<0.001
(n, Married or partnered)	(n = 361; 55.7%)	(n = 92,620; 65.0%)	
Education			<0.001
Kindergarten	n = 2;	n = 174;	0.1%
Grades 1–8	n = 8;	n = 2,819;	2.0%
Grades 9–11	n = 74;	n = 7,867;	5.5%
Grade 12 or GED	n = 193;	n = 37,665;	26.4%
Some college/technical school	n = 200;	n = 39,767;	27.9%
College grad or more	n = 174;	n = 54,496;	38.2%
Annual Household Income			<0.001
<10,000	n = 52;	n = 6,496;	4.5%
\$10,000 to \$14,999	n = 45;	n = 5,282;	3.7%
\$15,000 to \$19,999	n = 62;	n = 7,909;	5.5%
\$20,000 to \$24,999	n = 64;	n = 9,750;	6.8%
\$25,000 to \$34,999	n = 66;	n = 12,700;	8.9%
\$35,000 to \$49,999	n = 75;	n = 18,769;	13.1%
\$50,000 to \$74,999	n = 95;	n = 23,817;	16.7%
\$75,000 or more	n = 139;	n = 44,969;	31.5%
Don't know/not sure	n = 39;	n = 7,817;	5.5%
Refused	n = 14;	n = 5,422;	3.8%
Employment Status			<0.001
Employed for wages	n = 348;	n = 90,202;	63.1%
Self-employed	n = 41;	n = 13,289;	9.3%

Variable	Survivor	Control	p-value
Out of work > 1 year	n = 33; 5.1%	n = 4,442; 3.1%	
Out of work < 1 year	n = 47; 7.2%	n = 8,005; 5.6%	
Homemaker	n = 75; 11.5%	n = 13,315; 9.3%	
Student	n = 38; 5.8%	n = 5,850; 4.1%	
Retired	n = 2; 0.3%	n = 681; 0.5%	
Unable to work	n = 65; 10.0%	n = 6,830; 4.8%	
Refused	n = 2; 0.3%	n = 318; 0.2%	

Table II

Distribution of Cancer Diagnoses in Survivor Group

Type of Cancer	n	%
Cervical	273	41.9
Melanoma	50	7.7
Other skin	43	6.6
Ovarian	43	6.6
Hodgkin's or Non-Hodgkin's Lymphoma	39	6.0
Leukemia (blood)	31	4.8
Endometrial	17	2.6
Bone	16	2.5
Thyroid	15	2.3
Testicular	13	2.0
Brain	12	1.8
Breast	12	1.8
Other ^a	71	10.9
Don't know	14	2.2
Refused	2	0.3

^aIncludes head/neck, oral, colon, esophageal, pancreatic, stomach, lung, bladder, or renal

Table III

Logistic Regression Analysis of Differences Between Survivor and Control Groups With Regard to Socioeconomic Outcome Variables.

Variable	Survivor		Control		Odds Ratio ^b	95% CI	p-value
	n	(%) ^a	n	(%) ^a			
Education							
Some college or less	477	(73.3)	88,292	(61.8)			
College grad or more	174	(26.7)	54,496	(38.2)	0.61	0.51 – 0.73	<0.001
Marital Status							
Non-married or non-partnered	287	(44.3)	49,945	(35.0)			
Married or partnered	361	(55.7)	92,620	(65.0)	0.77	0.66 – 0.90	0.001
Annual Household Income							
< 20,000	159	(26.6)	19,687	(15.2)	2.00	1.64 – 2.38	<0.001
20,000	439	(73.4)	110,005	(84.8)	2.00	1.64 – 2.38	<0.001
Employment							
Unemployed/Homemaker/Student/Retired	260	(40.1)	39,123	(27.4)			
Self-employed/Employed for wages	389	(59.9)	103,491	(72.6)	0.73	0.62 – 0.85	<0.001

All comparisons control for age, sex, and minority status;

^aPercentage is based upon available data for each variable;

^bReference group is Control group.

Table IV
Logistic Regression Analysis of Differences Between Survivor and Control Groups On Personal History of Comorbid Conditions.

Variable	Survivor		Control			Odds Ratio ^b	95% CI	p-value
	n	(%) ^a	n	(%) ^a				
Diabetes								
No	614	(94.3)	136,427	(95.5)				
Yes	37	(5.7)	6,412	(4.5)	1.97	1.41 – 2.77	<0.001	
High Blood Pressure								
No	539	(82.9)	116,821	(81.8)				
Yes	111	(17.1)	25,909	(18.2)	1.44	1.17 – 1.78	0.001	
High Cholesterol								
No	322	(70.5)	77,708	(72.1)				
Yes	135	(29.5)	30,043	(27.9)	1.53	1.24 – 1.88	<0.001	
Heart Attack								
No	628	(96.9)	140,950	(98.8)				
Yes	20	(3.1)	1,640	(1.2)	5.15	3.27 – 8.11	<0.001	
Angina/Coronary Heart Disease								
No	630	(97.2)	140,876	(98.9)				
Yes	18	(2.8)	1,606	(1.1)	4.29	2.66 – 6.91	<0.001	
Stroke								
No	633	(97.4)	141,351	(99.0)				
Yes	17	(2.6)	1,389	(1.0)	3.94	2.42 – 6.43	<0.001	
Asthma								
No	493	(75.8)	122,736	(86.0)				
Yes	157	(24.2)	19,990	(14.0)	1.72	1.44 – 2.06	<0.001	
Arthritis								
No	473	(73.1)	119,341	(83.8)				
Yes	174	(26.9)	23,123	(16.2)	2.67	2.22 – 3.20	<0.001	

All comparisons control for age, sex, and minority status;

^aPercentage is based upon available data for each variable;

^bReference group is Control group.

Table V
Means and Standard Deviations for Survivor and Control Groups For Current Physical and Mental Health Status.

Variable	Survivor $\bar{M}^a$ (SD)	Control $\bar{M}^a$ (SD)	F-value	p-value	Effect Size ^b
Life Satisfaction ^c	1.83 (0.71)	1.63 (0.63)	66.76	<0.001	0.32
Social and Emotional Support ^d	2.08 (1.12)	1.85 (1.01)	34.00	<0.001	0.23
General Health Rating ^e	2.82 (1.16)	2.29 (1.01)	186.87	<0.001	0.52
# Days Physical Health Not Good Past 30 Days	6.48 (9.85)	2.89 (6.85)	176.02	<0.001	0.52
# Days Mental Health Not Good Past 30 Days	7.83 (11.29)	3.86 (7.87)	161.09	<0.001	0.50
# Days Not Enough Rest or Sleep Past 30 Days	13.08 (11.34)	9.76 (10.24)	67.21	<0.001	0.32
Body Mass Index	28.14 (7.00)	27.67 (6.29)	3.56	0.059	0.07
Personal History of Comorbid Conditions ^f	1.34 (1.25)	0.89 (1.07)	81.64	<0.001	0.42

All comparisons control for age, sex, and minority status;

^aCovariate adjusted means are shown;

^bExpressed in SD units;

^cRange 1–4 with higher values representing less satisfaction;

^dRange 1–5 with higher values representing less social and emotional support;

^eRange 1–5 with higher values representing poorer general health;

^fRange 0–8.

Table VI
Logistic Regression Analysis of Differences Between Survivor and Control Groups on Health Behavior Variables.

Variable	Survivor		Control		Odds Ratio ^b	95% CI	p-value
	n	(%) ^a	n	(%) ^a			
Alcoholic Drink in Past 30 Days							
No	308	(47.3)	63,533	(44.5)			
Yes	343	(52.7)	79,176	(55.5)	0.99	0.84 – 1.15	0.847
Binge Drinking in Past 30 Days ^c							
No	526	(81.2)	115,958	(81.9)			
Yes	112	(18.8)	25,648	(18.1)	1.12	0.91 – 1.36	0.286
Current Cigarette Smoker							
No	409	(62.9)	113,341	(79.5)			
Yes	241	(37.1)	29,165	(20.5)	2.33	1.98 – 2.73	<0.001
Current Smokeless Tobacco Use							
No	625	(96.0)	134,380	(94.1)			
Yes	26	(4.0)	8,443	(5.9)	0.89	0.60 – 1.32	0.555
Five or More Servings of Fruits/Vegetables Per Day							
No	489	(75.1)	110,785	(77.6)			
Yes	162	(24.9)	32,053	(22.4)	1.05	0.88 – 1.26	0.595
Any Leisure-Time Exercise in Past 30 Days							
No	174	(26.7)	31,542	(22.1)			
Yes	477	(73.3)	111,274	(77.9)	0.73	0.61 – 0.87	<0.001
At Least 150 Minutes Moderate Physical Activity Per Week							
No	283	(43.5)	68,006	(47.6)			
Yes	368	(56.5)	74,926	(52.4)	1.15	0.98 – 1.34	0.081
At Least 60 Minutes Vigorous Physical Activity Per Week							
No	363	(55.8)	74,818	(52.3)			
Yes	288	(44.2)	68,114	(47.7)	0.89	0.76 – 1.04	0.136
Tested for HIV							
No	230	(35.8)	73,446	(52.4)			
Yes	412	(64.2)	66,803	(47.6)	1.79	1.52 – 2.11	<0.001

Variable	Survivor		Control		Odds Ratio ^b	95% CI	p-value
	n	(%) ^a	n	(%) ^a			
One HIV High Risk Situation							
No	595	(91.7)	137,321	(96.3)			
Yes	54	(8.3)	5,239	(3.7)	2.06	1.55 – 2.74	<0.001

All comparisons control for age, sex, and minority status;

^aPercentage is based upon available data for each variable;

^bReference group is Control group;

^cFive or more drinks on one occasion.