CHILDHOOD CANCER SURVIVOR STUDY
Analysis Concept Proposal

1. TITLE: Cancer Screening and Prevention Practices of Siblings of Survivors of Childhood Cancer

2. WORKING GROUP INVESTIGATORS: This proposed study will be within the Psychosocial Working Group and Cancer Control Working Group.

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3. SPECIFIC AIMS:

There is a rapidly growing population of pediatric cancer survivors because of improved multi-modal treatment regimens. There are now approximately 270,000 survivors of childhood cancer in the United States (US). [1] Five year survival rates of greater than 75 % have led to a rapidly growing population of childhood cancer survivors. [1] The consequences of cure; however, are not without a cost. One such cost is the impact of childhood cancer on siblings. Data from the US census bureau documents that average families have two children. [2] This suggests that there is a rapidly growing population of siblings that are impacted by childhood cancer.

Siblings experience losses with respect to physical and emotional availability of parents, unmet needs with respect to familial communication, involvement in the care of the patient, and support to continue their interests and activities.[3-5] Associated with these losses and unmet needs, previous reports have noted that the health care needs of siblings are often minimized and under-reported following the diagnosis of childhood cancer.[6] The long-term impact of this minimization and under-reporting within the context of other cancer-related stressors and family-related factors on the cancer screening and prevention practices of siblings has not been studied. Well accepted models that predict future health behaviors such as cancer screening and prevention practices include factors that may be altered by minimization and under-reporting of health care needs as a child.[7-8] As an example, recent reports suggest that siblings endorse the practice of other health risk behaviors (e.g. alcohol and tobacco use) to a greater extent than survivors.[9-11] This is especially concerning based on recent evidence which suggests that members of this rapidly growing population of siblings are at an increased risk of developing cancer.[12-13] Based upon the gap in the medical literature with respect to the impact of cancer upon family members, the National Cancer Institute (NCI), Office of Cancer Survivorship recognizes that it is critical to expand our assessment of the quality of life and care of the family members of cancer survivors.[14] Therefore, as the population of siblings of pediatric cancer survivors grows, the investigation of the long-term impact of childhood cancer on the cancer screening and prevention practices of siblings is an important endeavor.

Progress has been made in the characterization of the cancer screening practices of adult survivors of childhood cancer through the efforts of the Childhood Cancer Survivor Study

(CCSS).[15] In fact, an expanded analysis of cancer screening practices is currently underway. This expanded set of analyses focusing on breast, cervical, skin, and colon cancer screening practices uses recent data in order to reflect current guideline, recommendations, and practices. Additionally, comparison will be made between survivors, siblings, and a national sample of peers.

The CCSS has the potential to be a vital resource in understanding the impact of childhood cancer upon siblings. The proposed set of analyses builds upon the analyses which are underway. Our primary aim will be to characterize the impact of childhood cancer upon the cancer screening and prevention practices of siblings and compare them to a national sample. This characterization expands the focus from cancer screening to screening and prevention practices amongst the largest sample of siblings of childhood cancer survivors. Further validation of the analyses which are underway is also provided through the use of a different national sample. Our secondary aim will be to determine those sibling and survivor disease, treatment, and health-related factors that are associated with decreased screening and prevention practices in siblings of childhood cancer survivors. This characterization builds upon the unique strength of the CCSS dataset. Analyzing matched pairs of siblings and survivors will allow us to determine those survivor and sibling factors that are associated with decreased sibling cancer screening and prevention practices.

The proposed study will utilize data from two sources: the CCSS second follow-up questionnaire administered between 2002 and 2004 and the Brief Risk Factor Surveillance System (BRFSS) telephone survey administered in 2000.[16-17] The CCSS data used in this analysis are from a 24-page second follow-up questionnaire completed by self-report or telephone utilizing a trained interviewer. The BRFSS is an annual, standardized, state-based, random-digit-dial telephone survey of the non-institutionalized U.S. population completed with assistance from the Centers for Disease Control and Prevention. Cancer screening and prevention practice variables between the CCSS second follow-up questionnaire and the BRFSS 2000 are closely comparable and allow for assessment of cancer screening specifics across both populations at time points that will ensure the stability of cancer screening and prevention practices (see **Appendix A**). Additionally, these analyses focus upon a contemporary time period which will reflect current guidelines, recommendations, and practices.

Aim 1: To describe the cancer screening and prevention practices (skin cancer prevention, breast / cervical cancer screening practices) of siblings of survivors and compare them to national norms by age, gender (omitted for breast / cervical cancer screening), and race/ethnicity.

We hypothesize that the cancer screening and prevention practices of siblings of childhood cancer survivors will be decreased when compared with national norms by age, gender, and race/ethnicity.

Aim 2: To identify sibling's cancer and health-related factors (bereavement status, poor health status, presence of chronic health conditions, and psychological distress) associated with decreased cancer screening and prevention practices amongst siblings of survivors controlling for sociodemographic factors including sibling age, gender (omitted for breast / cervical cancer screening), race/ethnicity, insurance status, income, education, employment status, and marital status.

We hypothesize that sibling cancer and health-related factors (bereaved status, adverse health status, presence of chronic health conditions, and the presence of psychological distress) will be associated with decreased cancer screening and prevention practices amongst siblings of survivors.

Aim 3: To identify survivor disease / treatment (diagnosis, treatment intensity) and health-related factors (presence of a second cancer, poor health status, presence of chronic health conditions, and psychological distress) associated with decreased cancer screening and prevention practices amongst siblings of survivors controlling for sociodemographic factors including sibling age, gender (omitted for breast / cervical cancer screening), race/ethnicity, insurance status, income, education, employment status, and marital status.

We hypothesize that survivor disease / treatment-related factors (specific diagnoses and therapy of greater intensity) and health-related factors (presence of a second cancer, adverse health status, presence of a chronic health conditions, and the presence of psychological distress) will be associated with decreased cancer screening and prevention practices amongst siblings of survivors.

4. BACKGROUND AND RATIONALE:

4.1 Cancer Screening and Prevention Practices of Sibling and Health Behaviors:

Health behavior is defined as any activity undertaken by an individual who believes himself to be healthy for the purpose of preventing or detecting illness in a asymptomatic state.[18] Many well accepted models are used to predict these health behaviors. One such model is the health belief model which describes six domains (general health motivation, perceived vulnerability, perceived severity, perceived benefits of prevention, perceived barriers to actions, and cues to action) predictive of health behaviors.[7-8]

During the acute period of diagnosis and treatment siblings experience a number of losses with respect to parental availability on a physical and emotional level, an array of emotions (e.g. sadness, loneliness, rejection, anxiety, anger, and jealousy), and a host of unmet communication and support needs.[3-5] Associated with these changes, the health care utilization patterns of siblings are altered during the acute period of diagnosis and treatment as demonstrated by parental under-reporting with respect to sibling health and reduced health care utilization amongst siblings.[6]

Long-term morbidity and mortality, so-called "late effects" have been documented in survivors.[19-20] Due to these late effects, losses, emotional distress, and unmet needs continues to impact families long-term.[21] It is likely that health care utilization patterns of siblings remain altered. Additionally, the domains (e.g. general health motivation) that impact future health behaviors of siblings may be altered. In fact, recent reports suggest that siblings demonstrate increased health risk behaviors including the practice of risky alcohol practices and greater tobacco usage when compared with survivors.[9-11] The impact of the childhood cancer experience on other health behaviors such as cancer screening and prevention practices of siblings of childhood cancer survivors have not been studied.

4.2 Cancer Screening and Prevention Practices and the General Population:

Skin Cancer Prevention Practices

Skin cancer is the most common cancer diagnosed in the US.[22-23] Melanoma, the most serious of skin cancer subtypes, is estimated to impact nearly 60,000 individuals in the US annually, a number which continues to rise.[22-23] Melanoma also accounts for approximately 80% of skin cancer related deaths in the US.[22-23] Important risk factors for the development of skin cancer have been identified. One modifiable risk factor includes unprotected exposure to ultraviolet (UV) radiation.[24-25] This risk factor is especially important when considering UV radiation exposure at younger ages.[26] Despite the threat of skin cancer and the presence of modifiable risk factors, prevention behaviors are the exception rather than the rule.[27-28] In order to address these issues, nation-wide health initiatives such as Healthy People 2010 have focused on increasing skin protection practices and decreasing mortality rates associated with skin cancer.[29] Recommendations have been provided by various groups including the US Preventative Services Task Force and the International Agency for Research on Cancer.[30-31] These recommendations include the use of protective clothing and hats to avoid skin exposure to UV radiation, the application of sunscreen that meets a threshold sun protection factor, and the avoidance of mid-day sun exposure. Using these recommendations approaches aimed at realizing the goals set forth in nation-wide health initiatives have been implemented with some success.[32-33] Various risk factors have also been associated with suboptimal rates of skin cancer prevention behaviors. Demographic factors associated with decreased skin cancer prevention behaviors include younger age, male gender, lower socioeconomic status, and minority status.[27-28]

Breast and Cervical Cancer Screening

For women, breast cancer and cervical cancer are significant contributors to morbidity and mortality.[22-23] Breast cancer is the most common cancer which impacts women in the US excluding skin cancer. Nearly 180,000 women are diagnosed annually in the US and nearly 40,000 die each year from this cancer falling just behind lung cancer. Cervical cancer impacts roughly 10,000 women in the US annually. It accounts for approximately 4,000 cancer-related deaths annually in the US. Preventative screening efforts have played a role in the mortality reduction associated with breast and cervical cancer as increasing numbers of women are receiving appropriate cancer screening (e.g. mammograms and Pap tests).[34] Current recommendations regarding cancer screening practices focus on: 1) yearly mammography starting at the age of 40 years 2) cervical cancer screening starting 3 years after beginning sexual intercourse and no later than 21 years of age. Cervical cancer screening may be completed yearly with traditional Pap Testing and every two years with liquid Pap Testing. For those women with three consecutive normal exams the testing may be completed every 2 -3 years.[35]
Various risk factors have been associated with decreased rates of cancer screening including lower socioeconomic status, less access to care (e.g. uninsured), and minority status.[36-40]

5. ANALYSIS FRAMEWORK:

5.1 Sample:

The CCSS identified 20,602 eligible five year survivors. Of those contacted, 14,054 participated by completing a baseline questionnaire. A random sample of survivors was asked to identify their nearest age living sibling. The analyses of skin cancer prevention practices will utilize siblings who are $\geq$18 years of age at the time of completing the second follow-up

questionnaire (n=2980). The analyses of breast and cervical cancer screening practices will utilize female siblings who are $\geq$18 years of age at the time of completing the second follow-up questionnaire (n=1601) and their matched survivors.   The BRFSS 2000 will utilize data from participants in the 7 states which included the Women's Health and Skin Cancer Modules including Colorado, Maryland, South Dakota, Utah, Virginia, and Washington. Participants matching the age range of the CCSS Siblings, age $\geq$ 18 years will be used. Weights which reflect the distribution of the sample of siblings by age, race/ethnicity, and gender (where appropriate) will be applied.

5.2 Outcomes of Interest and Predictor Variables:

Aim 1: Outcomes of interest
  A. Skin Cancer Prevention
      a.   Sunscreen Use
      b.   Protective Clothing Use
      c.   Wearing a Hat
      d.   Staying in Shade
  B. Breast and Cervical Cancer Screening
      a.   Mammogram
      b.   Pap Test

  Predictor Variable:
  Not applicable (descriptive data)

Aim 2 and 3: Outcomes of interest
  A. Skin Cancer Prevention
      a.   Sunscreen Use
      b.   Protective Clothing Use
      c.   Wearing a Hat
      d.   Staying in Shade
  B. Breast and Cervical Cancer Screening
      a.   Mammogram
      b.   Pap Test

  Predictor Variable
  A. Sibling Factors
      a.   Bereavement
      b.   Health Status
      c.   Chronic Health Conditions
      d.   Psychological Distress
  B. Survivor Factors
      a.   Diagnosis
      b.   Treatment Intensity
      c.   Second Malignant Neoplasm
      d.   Health Status
      e.   Chronic Health Conditions
      f.   Psychological Distress
  E. Controlling for the effects of previously identified risk factors including age, gender (omitted for breast / cervical cancer screening), race/ethnicity, insurance status, income, education, employment status, and marital status.

5.3 Statistical analysis plan:

Descriptive statistics will include sibling and national sample demographic characteristics, such as, age of the sample, gender, race/ethnicity, insurance status, income, education, employment status, and marital status.

The primary outcomes of interest including skin cancer prevention practices (sunscreen, protective clothing, hat, and shade use) will be recoded for siblings and their peers. A dichotomous recoding scheme will be used in which the responses of always, often / near always will be recoded as demonstrating the prevention practice. The responses of sometimes, rarely / seldom, and never will be recoded as not demonstrating the prevention practice.

The primary of outcome of interest of breast and cervical cancer screening will be demonstrated by the presence or absence of mammography or Pap Testing, respectively. A dichotomous recoding scheme will be used in which responses will be recoded for siblings and their peers. The responses of less than 1 year age / within past year; 1-2 years ago / within the past 2 years; more than 2 years ago, but less than 5 years ago / within the past 3 years / within the past 5 years will be recoded as demonstrating the screening practice.   The responses of 5 or more years ago, don't know, never, and refused will be recoded as not demonstrating the screening practice.

Sibling disease and treatment-related risk factors will include the presence or absence of bereavement. Survivor disease and treatment-related risk factors will include diagnosis and treatment. Cancer diagnosis will be recoded to include CCSS eligible diagnoses including leukemia, CNS tumor, Hodgkin disease, Non-Hodgkin lymphoma, neuroblastoma, kidney tumor, sarcoma, and bone tumor. Treatment will be operationalized as treatment intensity and will be recoded as very intense (combined surgery, radiation, chemotherapy), moderately intense (combination of two modalities of therapy), and not intense (one modality of therapy).

Sibling health-related risk factors will include self-reported health status, the presence or absence of chronic health conditions as defined in previous CCSS publications using the NCI CTCAE.[20] Psychological distress will be measured by the Brief Symptom Inventory-18 (BSI-18).[41] The BSI-18 is an 18 item instrument which includes a summary measure or so-called "global severity index" (GSI). There are three symptom specific subscales including a depression, somatization, and anxiety subscale. This is a standardized, self-report inventory using five-point Likert scale items exploring the degree to which particular problems had distressed the respondent during the last 7 days (0 "not at all" to 4 "extremely"). Responses to items will be summed to provide the GSI (range 0-72) and subscales (range 0-24). They will then be transformed to T-scores using gender specific community norms. In order to facilitate comparisons, norms have a mean of 50 and a standard deviation of 10. A T-score of ≥ 63 represents the upper 10th percentile of scores reported in the normative sample and is considered significantly elevated. With respect to sibling health status and psychological distress it is important to note that only a subset of siblings completed these measures at the second follow-up questionnaire which may limit the inclusion of these variables in selected analyses. Survivor health-related risk factors are identical aside from the inclusion of the presence or absence of a second malignant neoplasm.

Sibling sociodemographic control variables will include current age, gender, race / ethnicity, insurance status, household income, educational status, employment status, and marital status. Age will recoded into 10 year increments (e.g. <20 years, 20-30 years, 30-40 years, 40-50

years, 50+ years). Gender will not be recoded. Race / ethnicity will be recoded as a dichotomous variable (e.g. White / non-Hispanic and other). Insurance status will not be recoded.   Household income will be recoded as a dichotomous variable (e.g. <$20,000, >$20,000). Educational status will be recoded and re-categorized (e.g. less than high school education, high school graduate, greater than high school education). Employment status will be recoded as a dichotomous variable (e.g. employed, unemployed). Employment will consist of those respondents that are working full-time, working part-time, employed for wages, or self-employed. All other categories will make up the categorization of unemployment. Marital status will be recoded as a dichotomous variable (e.g. married, unmarried). Married will consist of those respondents that are married or living as married. All other categories will make up the categorization of unmarried.

Specific Aim 1: Data will be analyzed for the CCSS sibling sample and the BRFSS sample. The sample description, the prevalence of cancer screening and prevention practices will be examined for the siblings and the national sample. Adjusted odds ratios and 95% confidence intervals will be calculated controlling for the potential contribution of demographic variables. Since the outcome variables are dichotomous logistic regression models will be estimated.

Specific Aim 2 and 3: Analyses will also be performed using only the sibling and matched survivor data in order to examine sibling and survivor disease, treatment, and health-related factors that are associated with the absence of cancer screening and prevention practices amongst siblings. Adjusted odds ratios and 95% confidence intervals will be calculated controlling for the potential contribution of demographic variables. Since the outcome variables are dichotomous logistic regression models will be estimated.

Analysis will be completed using the STATA PC software package version 10 (College Station, TX).

APPENDIX A

Equivalency of Cancer Screening and Prevention Practice Questions between the Childhood Cancer Survivor Study and the Behavioral Risk Factor Surveillance System Survey

Skin Cancer Prevention Practices

Childhood Cancer Survivor Study Follow-Up 2 Questionnaire	Behavioral Risk Factor Surveillance System 2000
C.11 When you were outside last summer for more than 15 minutes how often did you protect yourself from the sun by applying sunscreen with a SPF of 15 or more on all sun exposed skin areas? Never Rarely Sometimes Often Always	Module 17, Question 1 When you go outside on a sunny summer day for more than one hour, how often do you use sunscreen or sunblock? Always Near always Sometimes Seldom Never
C.11 When you were outside last summer for more than 15 minutes how often did you protect yourself from the sun by wearing protective clothing such as long-sleeved shirts and long pants? Never Rarely Sometimes Often Always	Module 17, Question 5 When you go outside on a sunny summer day for more than an hour, how often do you wear long-sleeved shirts? Always Near always Sometimes Seldom Never
C.11 When you were outside last summer for more than 15 minutes how often did you protect yourself from the sun by wearing a hat? Never Rarely Sometimes Often Always	Module 17, Question 4 When you go outside on a sunny summer day for more than an hour, how often do you wear a wide-brimmed hat or any other hat that shades your face, ears, and neck from the sun? Always Near always Sometimes Seldom Never

C.11 When you were outside last summer for more than 15 minutes how often did you protect yourself from the sun by staying in the shade?	Module 17, Question 3 When you go outside on a sunny summer day for more than an hour, how often do you stay in the shade?
Never Rarely Sometimes Often Always	Always Near always Sometimes Seldom Never

Breast / Cervical Cancer Screening

Childhood Cancer Survivor Study Follow-Up 2 Questionnaire	**Behavioral Risk Factor Surveillance System 2000**
B.4 When was the last time you had a mammogram? Less than 1 year ago 1-2 years ago More than 2 years ago, but less than 5 years ago 5 or more years ago Don't know Never	Core Section 11, Question 2 How long has it been since your last mammogram? Within the past year (1 to 12 months ago) Within the past 2 years (1 to 2 years ago) Within the past 3 years (2 to 3 years ago) Within the past 5 years (3 to 5 years ago) 5 or more years ago Don't know/Not sure Refused
B.5 When was the last time you had a Pap smear (test for cancer of the cervix)? Less than 1 year ago 1-2 years ago More than 2 years ago, but less than 5 years ago 5 or more years ago Never	Core Section 11, Question 8 How long has it been since you had your last pap smear? Within the past year (1 to 12 months ago) Within the past 2 years (1 to 2 years ago) Within the past 3 years (2 to 3 years ago) Within the past 5 years (3 to 5 years ago) 5 or more years ago Don't know/Not sure Refused

Predictor Variables

Domain	Item #	Item Wording
Sibling Disease / Treatment, Health-Related Factors		
Bereavement	Second Follow-Up	
Health Status	E.1	In general, would you say your health is excellent, very good, good, fair, poor?
Chronic Health Conditions	Baseline	Chronic Health Severity Index using NCI CTCAE[19]
Psychological Distress	G.1-G.18	Brief Symptom Inventory-18 Includes a global measure (global severity index) and subscales for depression, anxiety, and somatization[40]
Survivor Disease / Treatment, Health-Related Factors		
Diagnosis	Baseline	
Treatment Intensity	Baseline	
Second Malignant Neoplasm	R.1	Since you last provided us information, have you been diagnosed with another cancer, leukemia, tumor, or a recurrence?
Health Status	E.1	In general, would you say your health is excellent, very good, good, fair, poor?
Chronic Health Conditions	Baseline	Chronic Health Severity Index using NCI CTCAE[19]
Psychological Distress [41]	G.1-G.18	Brief Symptom Inventory-18 Includes a global measure (global severity index) and subscales for depression, anxiety, and somatization[40]

Additional Control Variables

Question	Childhood Cancer Survivor Study	Behavioral Risk Factor Surveillance System 2000
Current Age	Baseline Survey A.1 What is your date of birth? Code date	Core Section 10, Question 1 What is your age? Code age in years Don't know/Not sure Refused
Gender	Baseline Survey A.2 What is your sex? Male Female	Core Section What is the sex of the respondent? Male Female
Race/ethnicity	Baseline Survey A.4 To which one of the following groups do you belong? White Black American Indian or Alaskan Native Asian or Pacific Islander Other (specify) A. 4a Are you Hispanic? No Yes	Core Section 10, Question 2 What is your race? Would you say: a. White b. Black c. Asian, Pacific Islander d. American Indian, Alaska Native e. Other (specify) Don't know/Not sure Refused 34. Are you of Spanish or Hispanic origin? a. Yes b. No Don't know/Not sure Refused
Insurance Status	Follow-Up 2, Question M.1 Do you currently have insurance? Canadian Resident No Yes	Do you have any kind of health care coverage including health insurance, prepaid plans such as an HMO, or government plans such as Medicare? Yes No Don't Know / Not Sure Refused

Household Income	Follow-Up 2, Question S.1 Over the last year, what is the total income of the household you live in? Less than $19,999 $20,000 - $39,999 $40,000 - $59,999 $60,000 - $79,999 $80,000 - $99,999 Over $100,000 Don't know	Core Section 10, Question 8. Is your annual household income from all sources: a. Less than $25,000 b. Less than $20,000 c. Less than $15,000 d. Less than $10,000 e. Less than $35,000 f. Less than $50,000 g. Less than $75,000 h. $75,000 or more Don't know/Not sure Refused
Education	Follow-Up 2, Question 1 What is the highest grade of level of schooling that you have completed? 1- 8 years (grade school) 9 – 12 years (high school), but did not graduate Completed high school Training after high school, other than college Some College College graduate Post Graduate Level	Core Section 10, Question 6 What is the highest grade or year of school you completed? a. Never attended school or kindergarten only b. Grades 1 through 8 (Elementary) c. Grades 9 through 11 (Some high school) d. Grade 12 or GED (High school graduate) e. College 1 year to 3 years (Some college or technical school) f. College 4 years or more (College graduate) Refused
Employment	Follow-Up 2, Question 4 What is your current employment status? Working full-time Working part-time Caring for home or family Unemployed and looking for work Unable to work due to illness or disability Retired Student Other	Core Section 10, Question 7 Are you currently: a. Employed for wages b. Self-employed c. Out of work for more than 1 year d. Out of work for less than 1 year e. Homemaker f. Student g. Retired h. Unable to work Refused

Question	Childhood Cancer Survivor Study	Behavioral Risk Factor Surveillance System 2000
Marital Status	Follow-Up 2, Question 2 Which of these possibilities best describes your current marital status? Married Living as married Widowed Divorced Separated or no longer living as married	Core Section 10, Question 4 Are you: a. Married b. Divorced c. Widowed d. Separated e. Never been married f. A member of an unmarried couple Refused

APPENDIX B

TABLE 1: Demographics by dataset

Variable	Sibling N = (%)	BRFSS N = (%)
Age 18-20 20-29 30-39 40-50 50+		
Gender Male Female		
Race/ethnicity White Non-white		
Insurance Insured Uninsured		
Household Income ≤$20,000 >$20,000		
Education Less High School (HS) HS graduate More than HS		
Employment Unemployed Employed		
Marital Status Married Unmarried		
Survivor Diagnosis Leukemia CNS Hodgkin NHL NBL Sarcoma Bone		
Survivor Treatment Very Intense Moderately Intense Mildly Intense		

TABLE 2: Skin cancer prevention practices by dataset. Percent with each screening practice among sibling and BRFSS participants. Crude and adjusted odds ratios for each screening practice for siblings compared to their peers.

Variable	Sibling N = (%)	BRFSS N = (%)	Crude OR Sibling vs. BRFSS	Adjusted OR Sibling vs. BRFSS
Sunscreen Use Yes No				
Protective Clothing Use Yes No				
Wearing a Hat Yes No				
Staying in Shade Yes No				

TABLE 3: Characterization of skin cancer prevention practices described in the CCSS and BRFSS. Table will include prevalence described by sibling and general population subdivided by racial ethnic groups, gender, and age at interview.

	Sunscreen Use	Protective Clothing Use	Wearing a Hat	Staying in the Shade	BRFSS Sunscreen Use	BRFSS Protective Clothing Use	BRFSS Wearing a Hat	BRFSS Staying in the Shade
Race Ethnicity White Non-white								
Gender Male Female								
Age at interview 18-20 20-29 30-39 40+								

TABLE 4: The crude odds ratio (COR) for sibling skin cancer prevention practices given risk factor. The adjusted odds ratios (AOR) for screening practices predicts screening practices controlling for well known risk factors for suboptimal screening practices.

Variable	Sunscreen Use COR 95 % CI	Sunscreen Use AOR 95 % CI	Protective Clothing Use COR 95 % CI	Protective Clothing Use AOR 95 % CI	Wearing a Hat COR 95 % CI	Wearing a Hat AOR 95 % CI	Staying in the Shade COR 95% CI	Staying in the Shade AOR 95% CI
Survivor Diagnosis Leukemia CNS Hodgkin NHL NBL Sarcoma Bone								
Survivor Treatment Intensity Very Intense Moderate Intense Not Intense								
Survivor SMN Yes No								
Survivor Health Status Excellent/Very Good/Good Fair/Poor								
Survivor Chronic Health Condition None/Mild Moderate/Severe								
Survivor Global Distress Yes No **Depression** Yes No **Somatization** Yes No **Anxiety** Yes No								

TABLE 5: The crude odds ratio (COR) for sibling skin cancer prevention practices given risk factor. The adjusted odds ratios (AOR) for screening practices predicts screening practices controlling for well known risk factors for suboptimal screening practices.

Variable	Sunscreen Use COR 95 % CI	Sunscreen Use AOR 95 % CI	Protective Clothing Use COR 95 % CI	Protective Clothing Use AOR 95 % CI	Wearing a Hat COR 95 % CI	Wearing a Hat AOR 95 % CI	Staying in the Shade COR 95% CI	Staying in the Shade AOR 95% CI
Sibling Bereavement Yes No								
Sibling Health Status Excellent/Very Good/Good Fair/Poor								
Sibling Chronic Health Condition None/Mild Moderate/Severe								
Sibling Global Distress Yes No **Depression** Yes No **Somatization** Yes No **Anxiety** Yes No								

TABLE 6: Cancer screening practices by dataset. Percent with each screening practice among sibling and BRFSS participants. Crude and adjusted odds ratios for each screening practice for siblings compared to their peers.

Variable	Sibling N = (%)	BRFSS N = (%)	Crude OR Sibling vs. BRFSS	Adjusted OR Sibling vs. BRFSS
Pap Testing[A] Yes No				
Mammography[B] Yes No				

[A] Papinicolaou testing within the last five years
[B] For females > 40 years of age, report of having undergone a mammogram in the last five years

TABLE 7: Characterization of cancer screening practices described in the CCSS and BRFSS. Table will include prevalence described by sibling and general population subdivided by racial ethnic groups and age at interview.

	Sibling Pap Smear[A]	Sibling Mammogram[B]	BRFSS Pap Smear[A]	BRFSS Mammogram[B]
Race Ethnicity White Non-white				
Age at interview 18-20 20-29 30-39 40+				

[A] Papinicolaou testing within the last five years
[B] For females > 40 years of age, report of having undergone a mammogram in the last five years

TABLE 8: The crude odds ratio (COR) for screening practices given risk factor. The adjusted odds ratios (AOR) for screening practices predicts screening practices controlling for risk factors for decreased screening practices.

Variable	Sibling Pap Smear[A] COR 95 % CI	Sibling Pap Smear[A] AOR 95 % CI	Sibling Mammogram[B] COR 95 % CI	Sibling Mammogram[B] AOR 95 % CI
Diagnosis Leukemia CNS Hodgkin NHL NBL Sarcoma Bone				
Treatment Intensity Very Intense Moderate Intense Mild Intense				
Survivor SMN Yes No				
Survivor Health Status Excellent/Very Good/Good Fair/Poor				
Survivor Chronic Health Condition None/Mild Moderate/Severe				
Survivor Global Distress Yes No **Depression** Yes No **Somatization** Yes No **Anxiety** Yes No				

TABLE 9: The crude odds ratio (COR) for screening practices given risk factor. The adjusted odds ratios (AOR) for screening practices predicts screening practices controlling for risk factors for decreased screening practices.

Variable	Sibling Pap Smear[A] COR 95 % CI	Sibling Pap Smear[A] AOR 95 % CI	Sibling Mammogram[B] COR 95 % CI	Sibling Mammogram[B] AOR 95 % CI
Sibling Bereavement Yes No				
Sibling Health Status Excellent/Very Good/Good Fair/Poor				
Sibling Chronic Health Condition None/Mild Moderate/Severe				
Sibling Global Distress Yes No **Depression** Yes No **Somatization** Yes No **Anxiety** Yes No				

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