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**Title:** Health Related Concerns Among Siblings of Childhood Cancer Survivors: A report from the Childhood Cancer Survivor Study (CCSS)

## **Background**

Siblings of long-term survivors of childhood cancer can be at risk for persistent concerns regarding their future health and risk for cancer. We examined self-perceived future health and cancer risk concerns among such siblings.

## **Methods**

3,969 siblings (median age 29 [range 18 – 56] years) of 5+ year matched pair cancer survivors (n= 3,969; age 25 [6 – 48] years; time since diagnosis 19.6 [9.6-33.8] years) in the CCSS self-reported physical/psychosocial problems, including concerns regarding future health and cancer risk (dichotomized as concerned vs not concerned). Chronic health conditions (CHC) were graded using the Common Terminology Criteria for Adverse Events (CTCAE) system: mild (grade 1), moderate (grade 2), severe/disabling (grade 3), or life-threatening (grade 4). Sibling demographics, their matched survivor's diagnosis, era and treatment components, complications (death, relapse, disfigurement) as well as self-reported health status and CHCs for siblings and survivors were examined as potential risk factors for concern using multivariable logistic regression. Adjusted odds ratios (OR) and 95% confidence intervals (CI) are reported.

## **Results**

The prevalence of siblings reporting concerns regarding health and cancer risk decreased based on decades of matched survivor diagnosis: 1970-79 (73.3%; 63.9%), 1980-89 (67.2%; 62.6%), 1990-99 (45.7%; 52.3%). Risk factors for concerns included sibling poor/fair current health (future health OR 3.65, 95% CI 2.37-5.62 and cancer risk OR 1.54, 1.12-2.13) compared to good/very good/excellent health. Sibling grade 2 (future health OR 1.46, 1.23-1.74 and cancer risk OR 1.20, 1.01-1.42) or grade 3-4 CHCs (future health OR 1.37, 1.09-1.71 and cancer risk OR 1.28, 1.03-1.58) were associated greater concerns compared to those with less than grade 2 CHCs. Survivor treatment with chemotherapy/radiation was associated with elevated cancer risk concerns (OR 1.51, 1.13-2.02) compared to surgery/no therapy. Siblings of survivors with grade 3-4 CHCs (OR 1.35, 1.12-1.63) had greater future health concerns compared to those with less than grade 2 CHCs. Sibling bereavement was a risk factor for future health (OR 1.45, 1.04-2.03) and cancer risk (OR 1.44, 1.05-1.99) concerns.

**Conclusions**

The prevalence of sibling concerns regarding future health and cancer have diminished in more recent decades. Subgroups of siblings are at-risk for concerns over future health and cancer risk, partially determined by medical characteristics of their survivor and their own health status.