

## **Mortality risk in underweight survivors of childhood cancer.**

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**Background:** A substantial percentage of adult survivors of childhood cancer are underweight. Those at risk for underweight include survivors of Hodgkin leukemia and Wilms, as well as male survivors of leukemia, brain tumor, neuroblastoma, and soft tissue sarcoma. While the consequences of overweight and obesity have been well-described, outcomes among underweight childhood cancer survivors are unknown.

**Methods:** Underweight survivors were identified by self-reported body mass index (BMI) less than 18.5 kg/m<sup>2</sup> on either the baseline or the first follow-up questionnaire from the Childhood Cancer Survivor Study (CCSS). Outcomes were assessed in subsequent CCSS questionnaires and National Death Index query and included mortality or second malignant neoplasm within two years of BMI report. Cross-sectional models using generalized estimating equations were built in a stepwise manner, including significant confounders.

**Results:** Of the 9454 survivors who reported BMI in the baseline or first follow-up questionnaire, 863 participants were found to be underweight and had sufficient follow-up to be included in the analysis. Compared to normal weight survivors, underweight survivors were more likely to be minority race/ethnicity, have low household income, be former smokers, have a prior chronic condition, and to have a history of radiation therapy. In addition, underweight survivors were found to be at significant risk for mortality. In multivariate analysis including age, race/ethnicity, household income, smoking status, prior chronic condition and history of radiation therapy, the odds for death within 2 years for underweight survivors, compared to normal weight survivors, was 2.82 (95%CI: 1.64-2.82; P<0.01). The unadjusted risk of second malignant neoplasm within two years among underweight survivors compared to normal weight survivors was not increased (OR 1.31; 95%CI: 0.60-2.85; P=0.49).

**Conclusions:** Childhood cancer survivors who are underweight are at significant risk for short-term mortality, unrelated to smoking status, chronic illness, or second malignancy. Whether targeted nutritional interventions would ameliorate this risk is unknown.