

Title: Disparities in Cardiovascular Risk Factors by Race/Ethnicity among Adult Survivors of Childhood Cancer: A Report from the Childhood Cancer Survivorship Study (CCSS)

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Background: Racial, ethnic, and socioeconomic disparities are documented in outcomes for childhood cancer survivors. Understanding whether childhood cancer modifies established disparities in cardiovascular risk factors (CVRFs) in the general population would inform strategies to reduce health inequities among survivors.

Methods: The CCSS is a retrospectively constructed cohort with prospective follow-up consisting of 25,579 five year survivors of childhood cancer diagnosed between 1970 and 1999. We estimated the incidence of self-reported Common Terminology Criteria for Adverse Events (CTCAE) grade ≥ 2 CVRFs (hypertension, diabetes, dyslipidemia, and obesity) and multiple (≥ 2) CVRFs among survivors. Multivariable Poisson regression estimated the rate ratios (RR) of CVRFs by race/ethnicity, adjusted for key treatment exposures and demographics.

Results: Within the CCSS cohort, there were 20,416 non-Hispanic White (NHW), 1625 non-Hispanic Black (NHB), and 2043 Hispanic survivors with the cumulative incidence estimates of each CVRF at age 40 displayed in Table 1. Survivors who self-reported "Other" or mixed race were excluded for this analysis (n=1495). NHB survivors were more likely to report hypertension (unadjusted RR 1.3; 95% Confidence Interval [CI] 1.0-1.6), diabetes (RR 1.6; 95% CI 1.0-2.4), obesity (RR 1.6; 95% CI 1.4-1.9), and multiple CVRFs (RR 1.3; 95% CI 1.2-1.5), whereas Hispanic survivors were more likely to report diabetes (RR 1.7; 95% CI 1.2-2.4), obesity (RR 1.4; 95% CI 1.2-1.5), and multiple CVRFs (RR 1.1; 95% CI 1.0-1.3) compared with NHW survivors. These observed disparities in CVRFs remained nearly unchanged even after adjustment for sociodemographic factors (age, sex, household income, education, marital status, employment, and insurance) and treatment exposures (Yes/No for anthracyclines, alkylators, and chest radiation).

Conclusions: NHB and Hispanic adult survivors demonstrate a higher burden of CVRFs compared with NHW survivors, particularly diabetes and obesity. The associated morbidity of these conditions and established increase in risk for more severe cardiovascular disease emphasizes the need for interventions to mitigate CVRFs to promote health equity among these survivors.

Table 1. Cumulative Incidence of CVRFs by Race/Ethnicity at Age 40

	Cumulative incidence (Percentage, 95% CI) at age 40				
Race/Ethnicity	Hypertension	Diabetes	Dyslipidemia	Obesity	≥2 CVRFs
NHW (n=20,416)	14.7 (14.0-15.3)	5.2 (4.8-5.6)	10.2 (9.6-10.7)	32.5 (31.6-33.3)	12.6 (12.0-13.2)
NHB (n=1625)	20.7 (17.7-23.7)	9.2 (7.2-11.2)	6.6 (4.6-8.6)	50.0 (46.4-53.3)	18.6 (15.5-21.6)
Hispanic (n=2043)	14.1 (11.8-16.4)	10.1 (8.2-11.9)	11.1 (8.9-13.2)	50.1 (47.0-53.1)	16.4 (13.9-18.9)

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