

## Cost-effectiveness of screening guidelines to prevent heart failure in childhood cancer survivors: A report from the Childhood Cancer Survivor Study (CCSS)

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**Background:** Childhood cancer survivors treated with anthracyclines or chest radiation therapy (RT) are at risk for left ventricular dysfunction (LVD) and subsequent heart failure (HF). The International Guideline Harmonization Group (IGHG) recommends risk-based screening echocardiograms for LVD, but evidence supporting its frequency and cost-effectiveness is limited.

**Methods:** Using data from the CCSS, we developed a microsimulation model of the clinical course of LVD and HF to estimate long-term health and economic outcomes associated with screening for IGHG-defined risk groups (low [anthracycline 1-99 mg/m<sup>2</sup> and/or RT <15 Gy], moderate [100 to <250 mg/m<sup>2</sup> or 15 to <35 Gy], high [ $\geq$ 250 mg/m<sup>2</sup> or  $\geq$ 35 Gy or ( $\geq$ 100 mg/m<sup>2</sup> and  $\geq$ 15 Gy)]). We compared 1, 2, and 5-year interval-based screening to no screening. Screening performance and pharmacological treatment effectiveness were based on published studies. Costs and quality of life weights were based on US averages and published studies. Outcomes included lifetime HF risk, quality-adjusted life years (QALYs), lifetime costs, and incremental cost-effectiveness ratios (ICERs). Strategies with ICERs <\$100,000/QALY gained were considered cost-effective.

**Results:** Among the IGHG risk groups, the lifetime HF risk in the absence of screening was 37% (high), 25% (moderate) and 17% (low). Screening every 2 or 5 years was cost-effective for the high-risk group, and every 5 years for the moderate-risk group. In contrast, routine screening may not be cost-effective for the low risk group, representing ~40% of those for whom screening is currently recommended.

**Conclusions:** Our findings can inform screening guidelines and suggest that LVD/HF surveillance for low-risk survivors warrants careful consideration.

Risk group	Screening interval, years	Absolute lifetime HF risk reduction, % <sup>a</sup>	Lifetime costs, \$ <sup>b</sup>	ICER, \$/QALY
High	No screening	–	2,130	–
	5	2.1	4,520	26,780
	2	3.1	7,230	55,840
	1	3.7	11,220	138,040
Moderate	No screening	–	1,020	–
	5	1.4	3,450	55,450
	2	2.2	6,340	124,770
	1	2.6	10,680	309,510
Low	No screening	–	570	–
	5	1.0	2,990	101,330
	2	1.5	5,940	234,190
	1	1.8	10,390	570,310

<sup>a</sup> Relative to none; <sup>b</sup> Discounted at 3% annually