

# Poverty linked to higher risk of death in children with cancer undergoing transplant

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Despite the increasing use and promise of hematopoietic cell transplantation (HCT) as curative therapy for children with cancer and other life-threatening diseases, new research suggests that children transplanted for cancer are more likely to die from treatment-related complications if they live in poorer neighborhoods. The study, published

today in the journal *Blood*, also found that having Medicaid versus private insurance, another marker of poverty, was associated with a higher chance of dying. Researchers say the results underscore the need to better understand and mitigate the effects of poverty and other social determinants of health on pediatric cancer care.

Hematopoietic cell transplantation, also called stem cell or bone marrow transplantation, is a treatment option for patients with blood cancers such as leukemia or lymphoma, as well as certain non-malignant conditions such as sickle cell disease or immunodeficiencies. It is only accessible at some medical centers. Together with radiation therapy or chemotherapy, HCT is designed to increase the chance of eliminating the cancerous or abnormal blood cells, and of restoring normal blood cell production.

The data revealed that [children](#) under the age of 18 with cancer who live in communities with high [poverty](#) rates had a 34% greater risk of treatment-related mortality following HCT compared with children in low-poverty areas. Even after adjusting for a child's disease and transplant-related factors, the data revealed children on Medicaid had a 23% greater risk of dying from any cause within five years of undergoing HCT and a 28% greater risk of treatment-related mortality when compared to children with [private insurance](#).

"Our study shows that even after children with cancer have successfully accessed this high-resource treatment at specialized medical centers, those who are exposed to poverty are still at higher risk of dying of complications after treatment and of dying overall," said lead author Kira Bona, MD, MPH, Attending Physician, Dana-Farber/Boston Children's Cancer and Blood Disorders Center. "Simply providing the highest quality complex medical care to children who are vulnerable from a social perspective is inadequate if our goal is to cure every child with cancer."

One in five children in the U.S. lives in a household with an income below the federal poverty level. While previous studies have shown an association between household poverty and poorer outcomes in HCT procedures generally, there are limited data on how poverty influences the success of HCT in children specifically.

Dr. Bona and her team sought to fill this gap by reviewing outcomes data for pediatric allogeneic transplant recipients from the Center for International Blood and Marrow Transplant Research Database, the largest available repository of HCT outcomes. The researchers looked at two cohorts of patients: 2,053 children with malignant disease and 1,696 children with non-malignant disease, who underwent a first HCT between 2006 and 2015. Neighborhood poverty exposure was defined according to U.S. Census definitions as living within a ZIP code in which 20% or more of the residents live below 100% of the Federal Poverty Level. They also stratified patients by type of insurance and used Medicaid as a proxy measure for household level poverty. The researchers looked at pediatric patients' overall survival defined as the time from HCT until death from any cause, as well as relapse, transplant-related mortality, acute and chronic graft-versus-host disease, and infection in the first 100 days following HCT.

Interestingly, neighborhood poverty or having Medicaid insurance did not seem to affect outcomes, including overall survival, relapse, or infection, among children transplanted for non-malignant diseases such as sickle cell disease. Dr. Bona said the study does not explain why this might be and more research is needed; however, it is possible that physicians and families of children with non-malignant conditions who face social health challenges may elect to avoid intensive HCT procedures.

One study limitation is its reliance on proxy measures of household poverty (ZIP code and Medicaid insurance) that do not provide insight

into specific aspects of an individual child's socioeconomic exposures and the home environment in which they live that may interfere with their ability to navigate the health care system. Dr. Bona says researchers and clinicians have historically not considered social determinants of health as being as important as biological variables in specialized cancer care and so have not collected data on these factors as part of research. She says this is a missed opportunity.

"We as a field need to recognize that non-biological variables such as your exposure to poverty and other social determinants of health matter just as much as many of the biological variables we pay close attention to when thinking about outcomes for children, and these variables must be collected systematically for research if we want to optimize the care and outcomes of the children we serve," Dr. Bona said.

If future studies could collect more nuanced measures of poverty such as household material hardship (e.g., [food insecurity](#), access to heat and electricity, housing insecurity, transportation insecurity) or language barriers, targeted interventions in the form of assistance programs could potentially help mitigate social hardships and improve the overall care of children with [cancer](#).

**More information:** Kira Bona et al. Neighborhood-Poverty and Pediatric Allogeneic Hematopoietic Cell Transplantation Outcomes: A CIBMTR Analysis, *Blood* (2020). [DOI: 10.1182/blood.2020006252](https://doi.org/10.1182/blood.2020006252)

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