Socioeconomic Status and Ethnicity Impact Pediatric Bone Cancer Outcomes

University of Colorado's Adam Green, MD, aims to use research findings to help address disparities in childhood cancers.

April 6, 2023 By University of Colorado Cancer Center and Rachel Sauer

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Pediatric osteosarcoma patients who are Hispanic or live in areas of high language isolation are more likely to have metastatic disease at the time of diagnosis, recently publish research shows.

The research, led by University of Colorado Cancer Center member Adam Green, MD, an associate professor of pediatric hematology and oncology in the CU School of Medicine, also showed that regardless of metastatic status, pediatric osteosarcoma (OST) patients with public insurance had increased odds of death compared to those who have private insurance.

Further, the research shows that adolescent Ewing sarcoma (ES) patients who are non-white had higher odds of death compared with white patients. Adolescents with metastatic ES who live in higher poverty areas had increased odds of death compared with those living in less impoverished areas.

These findings are significant because OST and ES are the first- and second-most common bone cancers in children. While socioeconomic and demographic disparities in cancer diagnosis and outcomes have been deeply documented, they continue to have a significant impact on children and families living with a bone cancer diagnosis.

"As a clinician, I've seen some cases where children and adolescents present very late with bone tumors," explains Green, attending physician at Children's Hospital Colorado. "That made us wonder whether there are specific socioeconomic or demographic factors that may be impacting their presentation and outcomes and if there are, how we can be better addressing those disparities."

Understanding Disparities

Green has long been interested in how socioeconomic status, race, and ethnicity affect outcomes,

and has previously contributed to research studying those factors in retinoblastoma, or eye tumor, outcomes.

“Retinoblastomas mostly occur in babies, so we were interested in looking at the opposite end of the spectrum and most bone cancer patients are adolescents,” Green says. “We know youth and adolescence have specific challenges in terms of medical care — kids are a bit more independent and have some increased responsibility to report symptoms to their parents or doctors, which can be a challenge.”

Green and his co-researchers analyzed data from the National Cancer Institute’s Surveillance, Epidemiology, and End Results (SEER) Program, which is a database designed to represent the geographic diversity of the United States. They analyzed the data for the existence of disparities in pediatric OST and ES patients, and then looked at pre- and post-diagnostic issues, including the stage of disease at which the patient presented and survival outcomes.

They found that Hispanic children diagnosed with ES without metastasis had increased odds of death compared with non-Hispanic children. Further, they found that living in a disadvantaged county by poverty level was associated with 4.5-fold increased odds of death for adolescents with non-metastatic OST.

Getting the Treatment They Need

The findings aligned with the research hypothesis that demographic and socioeconomic risk factors are associated with both a greater likelihood of metastatic disease at diagnosis and poorer survival outcomes. One possible reason, especially in OST, is that barriers to care may increase the likelihood of metastatic disease at diagnosis.

Also, decreased English proficiency may be a barrier to diagnosis, leading to poorer outcomes, which may be supported by the difference noted for children in language-isolated populations that was not seen in adolescents. Adolescents are more likely to have developed English proficiency enough to communicate in a medical setting, even if their parents have not.

These findings are important insight for a new research protocol, recently opened through the CU Cancer Center, in which Green and co-researchers are surveying healthy teenagers about their understanding of childhood cancer and its symptoms “so we can see whether there are other specific groups or factors that make kids less likely to understand the kinds of symptoms they should report to a parent or medical professional,” he says. “Are there ways that we can better educate teenagers in general?

“I think often kids are either confused or scared, and one of the misconceptions that we worry about is that kids may be thinking if they have cancer they are going to die no matter what, so if they ignore symptoms they can ignore the problem as long as possible. But one of the things we know about bone tumors is that if they present early, they are very curable. So, we need to not

only be working to understand what kids know about cancer, but how we can more systematically address disparities so that every child is able to feel like they can say something and then get the treatment they need.”

This article was originally published March 17, 2023, by the University of Colorado Cancer Center. It is republished with permission.
