

# High long-term survival of most common pediatric brain tumor, less when radiation was used

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The first comprehensive, large-scale cohort study of the long-term survival of children treated for low-grade gliomas, the most common pediatric brain tumor, finds that almost 90 percent are alive 20 years later and that few die from the tumor as adults. However, children who received radiation as part of their treatment had significantly lower long-term survival rates than children who were not radiated, researchers from Dana-Farber/Boston Children's Cancer and Blood Disorders Center report. These findings stand regardless of whether surgeons could successfully remove a child's entire tumor or only part of it, suggesting that the radiation itself may explain the difference.

The findings were published online by the journal *Pediatric Blood and Cancer*.

Delivery of [radiation](#) to children's developing brains has been linked to a number of adverse long-term effects, including cognitive development and endocrine function. While a number of major hospitals, including Dana-Farber/Boston Children's, have almost eliminated radiation in treating low-grade gliomas, the extent to which other institutions employ radiation varies, according to the study's senior author, Peter Manley, MD, of the Brain Tumor Center at Dana-Farber/Boston Children's.

"We found for the first time that once you survive your childhood with a low-grade glioma, you are not likely to die of that [tumor](#) as an adult,"

Manley said. "This is incredibly encouraging for patients and families. However, we also found some things that we are currently doing to treat low-grade gliomas, such as radiation, are increasing the rate of death later, so that as an adult you won't die of the tumor, but you may die from the treatment."

The data did not allow researchers to determine the precise mechanism driving the association between [radiation treatment](#) and reduced long-term [survival](#) (e.g., second cancers, other radiation-induced toxicities). However, given the excellent overall long-term survival findings among the patients studied, the team believes that doctors treating children for a pediatric low-grade glioma should make reducing long-term toxicity risk one of their primary concerns.

"We strongly recommend treatments that are less likely to cause long-term effects and second cancers," Manley said. "According to our analysis, radiation was the most common factor linked to differences in mortality among long-term survivors," he added. "There are multiple options available today for treating children with these tumors. We should exhaust all those before considering the use of radiation."

Low-grade gliomas—a family of non-malignant, usually non-aggressive tumors that includes pilocytic astrocytomas, diffuse astrocytomas and mixed gliomas—account for about 30 percent of all childhood [brain tumors](#). Treatment typically consists of surgery and chemotherapy. Radiation, once a key component of therapy for these gliomas, has been falling out of favor since the mid-1990s, as it has for other childhood cancers such as Hodgkin's lymphoma and germ cell tumors.

To better understand survival factors among this population, Manley, lead author Pratiti Bandopadhyay, MBBS, PhD, of Dana-Farber/Boston Children's, and their collaborators analyzed Surveillance, Epidemiology and End Results (SEER) data from the National Cancer Institute on

more than 4,000 patients diagnosed with pediatric low-grade gliomas between 1973 and 2008. Eighteen percent of the patients in the cohort received radiation as part of their treatment.

Overall the prognosis for children with low-grade gliomas is quite good, with five- and 10-year survival rates approaching 90 percent. Until now, though, the long-term survival—20 years and beyond—of adult survivors has never been comprehensively studied. Manley and his colleagues found little drop-off in survival at 20 years post-treatment, with almost 90 percent of pediatric survivors still alive.

Strikingly, though, only about 70 percent of patients treated with radiation were still alive 20 years after treatment. Other factors that affected survival included tumor location (cerebellum or not), tumor type (pilocytic or not), aggressiveness of the tumor (grade 1 vs. grade 2), year of diagnosis (before or after 1990) and age at diagnosis (

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