

Rural-urban differences in age-adjusted incidence and mortality rates for childhood brain and other nervous system tumors

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Background: Brain and other nervous system tumors (CNS) result in higher morbidity and mortality among children and adolescents, ranking as the second most common cause of cancer-related deaths in children and adolescents (0-19 years) after leukemia in the United States.

Significance of the problem: Previous studies reported the age and gender differences in incidence and mortality rates of childhood CNS tumors; however, there is a lack of literature examining rural-urban disparities.

Objectives: The study aimed to examine rural-urban differences in incidence and mortality of pediatric malignant CNS tumors.

Experimental design: We used data from the Surveillance, Epidemiology, and End Results (SEER)-17 registries database. All primary cases of malignant CNS tumors diagnosed among children aged 0-19 in the US between 2000 and 2020 were included. Rural/urban residence was classified using Rural-Urban Continuum Codes (Metropolitan vs. non-metropolitan). SEER*Stat was used to estimate the incidence, mortality, and survival rates. Stratified analysis was conducted to test the moderation effect of race, age, and gender on the relationship between rurality and the incidence, mortality, and survival rates.

Results: 14,487 malignant cases were included in the analysis. About 90% of cases occurred in urban areas and 10% in rural areas. The average annual incidence rate for 2000-2020 was 3.1 per 100,000. The incidence rate was higher among children aged 1-4 years (4.2 per 100,000 children). White children had the highest incidence rate (3.3 per 100,000). The annual average incidence rate was 3.4 per 100,000 children among children aged 0-14 years and 2.2 per 100,000 children among children aged 15-19 years. The lowest incidence was observed among American Indian/Alaska native children (1.3 per 100,000). The average annual incidence rate was not different between rural and urban children. However, among blacks, the incidence rate was higher among children living in urban areas compared to children living in rural areas ($p=0.027$). Overall, the mortality rate was not statistically different between rural and urban children; however, the mortality rate was higher among black children living in urban areas compared to those living in rural areas.

Conclusion: Rural-urban differences in incidence mortality were observed. Targeted public health interventions that address these disparities should be developed.



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