

ABSTRACT NO:30
NARRATIVE REVIEW**Childhood and Adolescent Central Nervous System Tumour Mortality in the United States, 1999– 2024: A CDC WONDER Joinpoint Analysis and Surveillance Model for Pakistan**Muhammad Ahmad Barakat¹, Hadi Flouni², Reena Bai³, Fatima Hazimeh⁴, Prem Chand⁵**Abstract**

Objective: Central nervous system (CNS) tumours are the leading cause of cancer-related mortality among children and adolescents worldwide, surpassing leukaemia. Pakistan has a predominantly young population but lacks a national cancer mortality registry. This study aimed to characterize temporal trends and sex disparities in childhood and adolescent CNS tumour mortality in the United States and propose a reproducible surveillance model applicable to registry-lacking settings such as Pakistan.

Methods: A retrospective population-based ecological time-trend study was conducted using CDC WONDER mortality data for individuals aged 0–19 years from 1999 to 2024, including race-bridged files (1999– 2020) and single-race files (2021–2024). Crude mortality rates per 100,000 population were analyzed by sex using Joinpoint regression. Annual Percent Change (APC), Average Annual Percent Change (AAPC), and 95% confidence intervals were calculated. Tests of parallelism and coincidence assessed sex-specific trend differences. Reporting followed the STROBE guideline.

Results: A total of 13,901 CNS tumour-related deaths were identified, including 7,547 males and 6,354 females. Overall mortality declined from 0.68 to 0.63 per 100,000, demonstrating a single-segment trend without joinpoints (AAPC –0.31%; 95% CI –0.61 to –0.01; $p=0.044$). No significant sex-specific differences in temporal decline were observed (female AAPC –0.25%; male AAPC –0.32%). Mortality trends were parallel ($p=0.82$); however, male mortality remained consistently higher than female mortality throughout the study (coincidence $p=0.0002$), with an overall period rate ratio of 1.13 (0.69 vs. 0.61 per 100,000).

Conclusion: Childhood and adolescent CNS tumour mortality in the United States demonstrated a modest but significant decline between 1999 and 2024, while maintaining a persistent male predominance. This population-based analysis provides an evidence-based framework for monitoring paediatric neuro-oncology outcomes and offers a scalable surveillance model for countries without national cancer mortality registries, including Pakistan.

Keywords: Central nervous system tumours; Pediatric oncology; CDC WONDER

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¹INSPECT-LB (Institut National de Santé Publique Epidémiologie Clinique et Toxicologie-Liban), Beirut, Lebanon, ²MEDICA Research Investigation, Hadath, Lebanon, ³Department of Pediatrics, Dow University of Health Sciences, Karachi, Pakistan, ⁴Faculty of Medicine, Beirut Arab University, Beirut, Lebanon, ⁵Department of Peds and Child Health, Liaquat National Hospital and Medical College, Karachi, Pakistan

Correspondence: Muhammad Ahmad Barakat

Email: Muhammadbarakat20@gmail.com

ORCID ID: 0009-0003-3136-1514