

*World Neurosurg.* 2024 May 29:S1878-8750(24)00910-0. doi: 10.1016/j.wneu.2024.05.147.

Online ahead of print.

# Development of predicting nomograms for diffuse astrocytoma and anaplastic astrocytoma: a study based on the SEER database

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PMID: 38821404 DOI: [10.1016/j.wneu.2024.05.147](https://doi.org/10.1016/j.wneu.2024.05.147)

## Abstract

**Background:** Astrocytoma is a type of adult-type diffuse gliomas that includes diffuse astrocytoma (DA) and anaplastic astrocytoma (AA). However, comprehensive investigations into the risk assessment and prognosis of DA and AA using population-based studies remain noticeably scarce.

**Methods:** In this study, we developed two predictive nomograms to evaluate the susceptibility and prognosis associated with DA and AA. The study cohort comprised 3,837 individuals diagnosed with DA or AA between 2010 and 2019 selected from the Surveillance, Epidemiology, and End Results (SEER) database. Independent predictors were identified and used to construct the nomograms for overall death (OD) and cancer-specific death (CSD) rates. The performance of the models was assessed using c-index, calibration curves, and receiver operating characteristic curve (ROC), and the clinical applicability was evaluated using decision curve analysis (DCA).

**Results:** The ROC curves in this study show excellent clinical applicability and predictive power. Notably, the area under the curves (AUCs) of the training and verification queues was higher than 0.80, thereby cementing the models' precision. Additionally, the calibration plots demonstrate that the anticipated mortality rates strikingly match with the measured values. This alignment of figures is sustained in the validation cohort. Furthermore, the decision curve analysis (DCA) corroborates the models' translational potential, reinforcing their relevance within real-world clinical settings.

**Conclusions:** The presented nomograms have not only exhibited good predictive performance but also showcased pragmatic clinical utility in prognosticating patient outcomes. Significantly, which will undoubtedly serve as a valuable asset for oncologists, facilitating informed treatment decisions and facilitating meticulous follow-up planning.

**Keywords:** Cancer-specific death; Competing risk model; Cox proportional-hazards model; Nomogram; Overall death.

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