

ABSTRACT NO:31
SCOPING REVIEW**Real-World Barriers to Molecular Biomarker Testing in Neuro-Oncology Clinical Trials in Resource-Limited Settings: A Scoping Review**Manal Rafique¹, Nadeem Sharif²**Abstract**

Objective: Molecular biomarkers are crucial for the diagnosis, prognosis, and enrollment in biomarker-driven neuro-oncology clinical trials, but their inequitable availability in low- and middle-income countries (LMICs) hinders uptake of the 2021 WHO Classification of CNS tumours. This scoping review reports an analysis of existing evidence concerning challenges to molecular biomarker testing within the context of neuro-oncology clinical trial recruitment in resource-limited settings.

Methods: An Arksey and O'Malley-based scoping review was conducted from May to July 2026 across PubMed, Scopus, and Web of Science (January 2021–April 2026). This review included articles on molecular diagnostic infrastructure, biomarker testing, clinical trial enrollment, and the management of neuro-oncologic patients in resource-restricted settings.

Results: Seventeen studies met the inclusion criteria. Restricted access to next-generation sequencing (NGS), DNA methylation profiling, and fluorescence in situ hybridization (FISH) preclude WHO CNS5-compliant diagnoses, thus often resulting in "not otherwise specified" (NOS) and less eligibility to access molecularly stratified trials. Of the 223 LMIC clinicians surveyed, lack of investigator-initiated funding and personal time allocation were the key systemic barriers. Diagnostic delay, limited neuropathology skills, and non-standardized biomarker reporting hindered clinical trial enrollment. Emerging liquid biopsy technologies including CSF cell-free DNA, showed high rate (82.5% of glioma cases) in ctDNA detection, however was restricted due to invasiveness and costs for sequencing. Collaborative capacity-building, virtual molecular tumour boards and modified consensus guidelines, all appear to be effective and evidence-based solutions.

Conclusion: Biomarker testing facility gaps constitute a major, modifiable obstacle to LMIC participation in neuro-oncology trials. Implementing a collaborative and structured approach to investment in diagnostics, standardized reporting, and international collaboration is essential for LMIC engagement with trials. Future trial designs should incorporate multi-tiered approaches to biomarkers reflecting available laboratory capacity in different locations.

Keywords: Neuro-oncology; Molecular biomarker testing; Resource-limited setting

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