

Table 3. Diagnostic and surveillance challenges affecting detection and characterization of *Streptococcus pneumoniae* disease in Nigeria

Diagnostic/surveillance issue	Evidence from Nigeria	Public health implication	Key reference
Limited sensitivity of individual diagnostic approaches	In Nigerian children with febrile illness, DBS rt-PCR detected 9/15 culture-positive pneumococcal specimens in the larger study; sensitivity was 60%. Six culture-positive specimens were PCR-negative.	Reliance on a single diagnostic approach may underestimate or misclassify pneumococcal disease.	Iroh Tam et al., 2018
Potential interpretive limitations of molecular detection	The 2016 DBS study identified nonspecific amplification and PCR-positive results associated with culture-confirmed non-pneumococcal infection; the authors cautioned against over-identification of pneumococcal infection.	Molecular assays require validated targets, appropriate thresholds and careful clinical interpretation.	Iroh Tam et al., 2016
Geographically limited sentinel surveillance	Longitudinal surveillance from 2010–2016 was conducted in five sentinel hospitals across five Nigerian states and involved children <5 years with suspected meningitis.	Sentinel surveillance provides valuable information but may not fully represent pneumococcal disease across all Nigerian regions and populations.	Tagbo et al., 2019
Incomplete serotype characterization	Among 71 pneumococcal meningitis cases identified by the Nigerian surveillance programme, serotyping was attempted for 31 samples; 28 were successfully serotyped.	Incomplete serotype data can limit assessment of vaccine-type disease and serotype replacement.	Tagbo et al., 2019
Need for continued serotype surveillance	The Nigerian surveillance investigators specifically identified the need for continued surveillance to determine the distribution of pneumococcal serotypes across Nigeria.	Continued surveillance is necessary to inform assessment of vaccine impact and future vaccine policy.	Tagbo et al., 2019
Limited isolate recovery in some hospital-based studies	In a 2025 two-hospital Delta State study, only 5 of 622 clinical specimens yielded confirmed pneumococcal isolates.	Low recovery rates can limit phenotypic characterization and estimation of local resistance patterns.	Nnanna Joy et al., 2025
Incomplete MIC-based antimicrobial characterization	The Delta State study did not perform MIC testing; therefore, categorical β -lactam susceptibility results were not assigned.	MIC-based testing may be necessary where categorical interpretation cannot reliably be obtained by disc diffusion.	Nnanna Joy et al., 2025