The detection of multiple meningitis pathogens, next-generation tools and new explorations – (Taqman)

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Background
Despite the implementation of effective conjugate vaccines against the three main bacterial pathogens that cause meningitis, *Streptococcus pneumoniae*, *Haemophilus influenzae* type b (Hib) and *Neisseria meningitidis* serogroup A., the burden of meningitis in West Africa remains high. The relative importance of other bacterial, viral and parasitic pathogens in central nervous system infections is less clear.

Methods
Cerebrospinal fluid (CSF) specimens were collected from children under five years with suspected meningitis presenting at pediatric teaching hospitals across West Africa in 5 countries that are part of the Paediatric Bacterial Meningitis (PBM) surveillance; Senegal, Ghana, Togo, Nigeria and Niger. CSF specimens were initially tested using a real time PCR assay used in routine meningitis surveillance targeting *N. meningitidis*, *S. pneumoniae* and *H. influenzae.* A custom meningitis TaqMan Array Card (TAC) assay was later used to detect 35 pathogens including 15 bacteria, 17 viruses, 1 fungus and 2 protozoans.

Results
Among 711 CSF specimens tested, the pathogen positivity rates were 2% and 20% by standard PCR (3 pathogens) and TAC (35 pathogens), respectively. TAC detected 10 bacterial pathogens, 8 viral pathogens, and *Plasmodium*. Overall, *E. coli* was the most prevalent (4.8%), followed by *S. pneumoniae* (3.5%) and *Plasmodium* (3.5%). Multiple pathogens were detected in 4.4% of the specimens. Detection of HIV and *Plasmodium* were associated with mortality. Among 220 neonates, 17% had at least one pathogen detected, dominated by the Gram-negative bacteria.

Conclusions
The meningitis TAC enhanced detection of pathogens in children with meningitis and may be useful for case-based meningitis surveillance.