

**Call:** 9th Call – JPIAMR Joint Call on Diagnostics and Surveillance 2019

**Title:** A K-mer Based Approach for Institutional AMR Surveillance, Transmission Monitoring, and Rapid Diagnostics

**Acronym:** K-STaR

**Project composition**

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**Abstract**

Antibiotic resistant organisms (AROs) have become increasingly difficult to treat, with rising morbidity and mortality worldwide. Healthcare institutions are often the epicenter for outbreaks of these antibiotic resistant organisms, and are also windows into their circulation within the broader community. Transmission of antibiotic resistant organisms within hospitals is under appreciated. Moreover, identification of linked strains that may be causing occult outbreaks is often not systematically performed. Genomic approaches can provide a better understanding of within-hospital transmission of AROs, which can be used to guide infection control practices. Some institutions have augmented their ARO surveillance with whole genome sequencing, but this is both expensive and time consuming, making it unsuitable for routine use. However, new approaches that use k-mer based algorithms along with genomic reference databases can provide rapid evaluation of pathogen lineage and potential for linked transmission. These same approaches can also be used to provide important rapid diagnostic information about the pathogen and likelihood of resistance to a given antibiotic. While there is much potential in these approaches, they need to be formally evaluated across care settings and geography before they can be trialled in the clinical setting. Here we propose a multi-continental prospective evaluation of the performance of a k-mer based approach for institutional surveillance of common multidrug resistant Gram-negative pathogens as well rapid prediction of antibiotic resistance patterns.