

AST.AI 抗藥風險預測之臨床決策輔助系統

AST.AI: CDSS for resistance prediction

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Abstract

Antimicrobial resistance (AMR) is a critical issue worldwide. The matrix-assisted laser desorption/ionization-time-of-flight (MALDI-TOF) mass spectrometry technique is a routine test that provides a rapid, convenient, accurate, and cost-effective method for bacterial identification in clinical microbiology laboratories. In addition to the identification of microorganisms, researchers have shown increasing interest in applying MALDI-TOF for detecting antibiotic-resistant strains. We developed a machine learning based antimicrobial susceptibility test prediction system, AST.AI, for AMR rapid predictions, and had been embedded in the clinical workflows. The AUC, positive predictive value, and turnaround time were assessed to evaluate the performance of this prediction system. For example, the mean waiting times to obtain results using AST.AI were 36.81 ± 21.32 h for *S. aureus* and 34.29 ± 19.32 h for *K. pneumoniae* infection. The AUC of all samples, blood isolates and non-blood isolates were 0.88–0.90 for methicillin-resistant *S. aureus* (MRSA) prediction and 0.78–0.83 for carbapenem-resistant *K. pneumoniae* (CRKP) prediction.

AST.AI indicates MRSA/CRKP risk 1–2 days earlier, empowering clinical decision making for antibiotic therapy. AST.AI integrates clinical laboratory practice and machine learning technology to accelerate the digital transformation of medicine.