Poster Title:
Characterizing Antibiotic Resistance Mechanisms in a Hospital Setting Using BioFire PCR Testing: A Quality Improvement Initiative

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Introduction and Objective:
The BioFire Blood Culture Identification 2 Panel (BCID2) is a multiplex polymerase chain reaction test that identifies pathogens and detects genetic markers associated with antimicrobial resistance directly from positive blood cultures. This rapid, molecular test provides actionable information faster than traditional methods. Our objective is to report the incidence, rate, and types of gram-negative resistance genes identified from bloodstream infections at our institution. With this information, we aim to identify emerging resistance trends using quarterly BCID2 reports to inform the Antibiotic Stewardship Program and guide physician antibiotic selection as new patterns arise.

Methods:
A retrospective analysis of all reported BCID2 results was compiled at AtlantiCare Regional Medical Center between January 2024 and December 2025. A monthly summary of BCID2 results was obtained from our Microbiology Laboratory Department, derived from inpatients with antibiotic-resistant gram-negative bloodstream infections. All results for the 2-year timeframe were included in the analysis. Data collection included identification of organisms and associated multidrug-resistant beta-lactamase genes detected by the BCID2 including CTX-M, Klebsiella pneumoniae carbapenemase (KPC), New Delhi metallo-β-lactamase (NDM), OXA-48–like, Verona integron–encoded metallo-β-lactamase (VIM), and/or imipenemase (IMP). Incidence, rate, and trends of beta-lactamase genes were evaluated over time, with emphasis on the frequency of genes, species of bacteria, and emergence of any trends. Results will be utilized to enhance our antibiotic stewardship program, assess our formulary antibiotic needs, and potentially improve patient outcomes. Descriptive statistics will be used to report the number, type, and incidence of resistance genes, including rates per 1000 patient-days. Approval for this project was granted by our Institutional Review Board.

Results:
From January 2024 to December 2025, a total of 399 multidrug-resistant (MDR) beta-lactamase–producing gram-negative bloodstream infections (BSI) isolates were identified by BioFire BCID2. CTX-M was the most common marker (n=94, 92.2%), followed by KPC (n=5, 4.9%), with no Class B metallo-β-lactamases (NDM, IMP, VIM) detected. Three isolates (2.9%) were positive for OXA-48–like enzymes, including two that co-harbored CTX-M. E.coli and K.pneumoniae accounted for 96.5% of isolates. Based on an average daily census of 270 adult inpatients at ARMC, the incidence was determined as 0.5 MDR gram-negative BSIs per 1,000 patient-days. These findings establish a baseline of MDR rate and no NDM emergence at ARMC.

Conclusions:
In the face of rising NDM prevalence in surrounding regions, its complete absence at ARMC defines a critical baseline for southern New Jersey. Monitoring resistance trends enables ARMC to detect changes promptly and share essential data with neighboring hospitals to support coordinated responses that protect patients from evolving resistance. The calculated incidence of 0.5 MDR gram-negative BSIs per 1,000 patient-days provides context for surveillance and intervention. These findings reinforce the value of molecular testing in identifying resistance shifts before they become widespread. Implementation of this quarterly surveillance program supports informed antibiotic selection, updated hospital guidelines, and increased awareness of emerging resistance to improve overall patient care.