Impact of BioFire FilmArray Blood Culture Identification Panel 2 (BCID2) and Antimicrobial Stewardship Interventions on Time to Optimal Antimicrobial Therapy in Patients with Positive Blood Cultures

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INTRODUCTION

- Earlier detection of organisms from blood cultures and appropriate antimicrobial therapy (AMT) is paramount to improved patient outcomes.
- Conventional methods for organism identification from blood cultures can take 2-5 days or longer.[1]
- Failure to initiate appropriate AMT <48 hours after initial blood culture collection is associated with increased mortality.[2,3]
- In patients with *Enterococcus* spp. bacteremia, a 22.6% increase in mortality was observed in those who were not initiated on appropriate AMT within 48 hours after sample collection.[2]
- Inappropriate empiric AMT in patients with BSIs caused by multi-drug resistant organisms (MDROs) is an independent risk factor for higher mortality and adverse outcomes.
- Patients with bacteremia due to extended-spectrum beta-lactamase-producing (ESBL) *Enterobacteriaceae* suffer longer delays in initiation of appropriate AMT, resulting in 3.5 times higher mortality compared to those without ESBL bacteremia.[3]
- Laboratory testing methods to shorten the time from blood culture collection to pathogen identification currently exist but are continually evolving to allow rapid and accurate detection of a larger group of pathogens.[1]
- The Blood Culture Identification Panel 2 (BCID2) is a polymerase-chain reaction test which can identify 43 different organisms and resistance genes within 1.5 hours of culture positivity.[4]
- The goal of this study is to determine the impact of BCID2 panel implementation at OSUMC.

OBJECTIVES

Primary Outcomes
Time to:
- Pathogen ID
- Effective therapy
- Optimal therapy

Intervention analysis:
- Type and Acceptance %

Secondary Outcomes
Clinical outcomes
Microbiologic cure
30-day data:
- All-cause mortality
- Bacteremia readmission

Length of stay (LOS) (hospital/ICU)

METHODS

- Approved by IRB as Quality Improvement Project
- Baseline characteristics: age, weight, gender, eGFR, comorbid conditions, risk factors for bacteremia, source of bacteremia, and sepsis criteria
- Quasi-experimental study of data over two 6-month periods with active interventions from the Stewardship Team in the post-intervention period
- Statistical analysis will be performed following complete data collection period

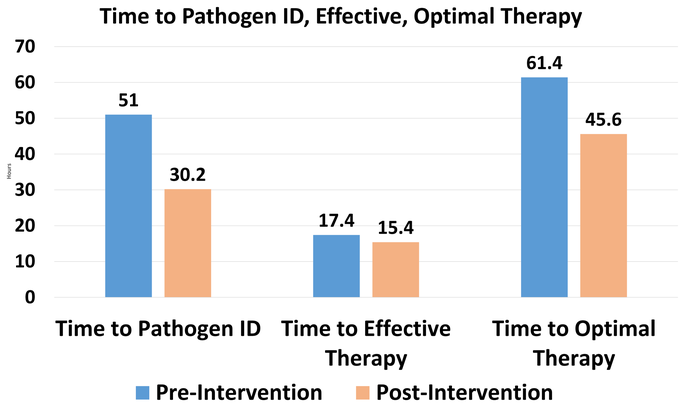
INCLUSION CRITERIA	EXCLUSION CRITERIA

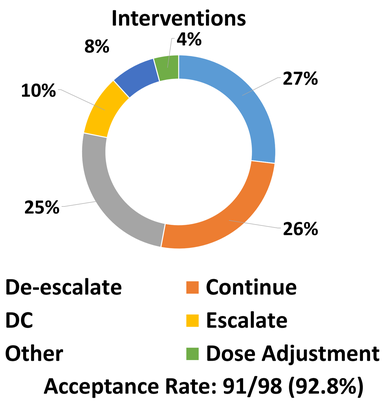
• Age ≥18 years old
• ≥ 1 positive blood culture with an organism included on the BCID2 panel
	• Positive blood cultures:
	  • At outlying facility
	  • Organism not included on the panel
	• Patient died within 24 hours of enrollment or status changed to CMO

PRELIMINARY RESULTS

	Basic Demographic			Comorbidities						Clinical/Risk Assessment	
	Gender	Age (years)	BMI (kg/m^2)	DM	Cancer	HIV	CKD	ASCVD	HF	≥ 2 Risk factor for bacteremia	≥ 2/4 SIRS criteria
Pre-Intervention (n=125)	68 Male (54.4%)	58.5	30.2	78 (62.4%)	4 (3.2%)	11 (8.8%)	42 (33.6%)	37 (29.6%)	38 (30.4%)	46 (36.8%)	105 (84%)
Post-Intervention (n=98)	64 Male (65.3%)	60.8	31.1	60 (61.2%)	3 (3.1%)	8 (8.2%)	33 (33.7%)	33 (33.7%)	32 (32.7%)	27 (27.6%)	82 (83.7%)

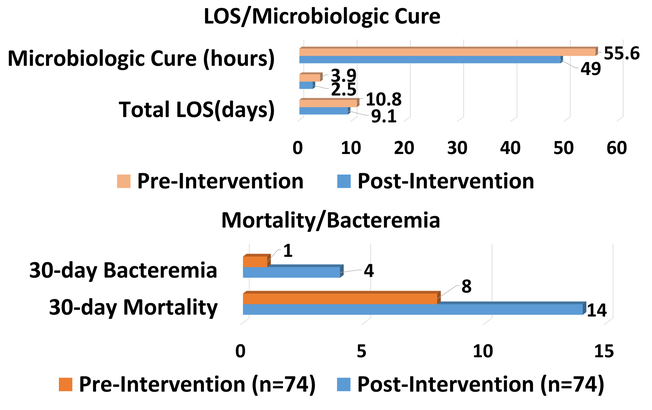
Primary Outcomes





Acceptance Rate: 91/98 (92.8%)

Secondary Outcomes



CONCLUSION/DISCUSSION

- BCID2 panel is more robust in identification of bacterial species and antimicrobial resistance genes compared to the BCID panel.[4]
- Preliminary results demonstrate utilization of the BCID2 panel reduced time to pathogen identification, effective therapy, and optimal therapy.[1]
- One factor which may account for a smaller difference in time to effective therapy in the pre- and post-intervention groups is prescription of appropriate empiric therapy for various sites of infection.
- Greater differences in time to optimal therapy between the two groups may be due to earlier identification of bacterial resistance genes with the BCID2 panel.
- A trend towards a reduction in total and ICU LOS was noted in the post-intervention group.
- The most common stewardship interventions were de-escalation and discontinuation of therapy. The majority AMT was discontinued following identification of contaminant species in positive blood cultures.
- Utilization of the BCID2 panel with antimicrobial stewardship intervention may improve time to effective and optimal therapy and reduce length of stay.

REFERENCES AND DISCLOSURES

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