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## BACKGROUND

- Prompt initiation of effective antimicrobial therapy improves clinical outcomes of patients with pneumonia<sup>1</sup>
- Mortality increases by 8% for each hour of inappropriate therapy in patients with septic shock<sup>2</sup>
- Broad-spectrum antimicrobials are initiated empirically, with the anticipation of de-escalating once microbiology data become available
- Culture remains the gold standard for bacterial identification
- Turnaround can be up to 72 hours. Which prolongs duration of empiric broad-spectrum antibiotics, increasing the risk of adverse events.
- Rapid diagnostic tests significantly shorten the time to pathogen identification
- When combined with an antimicrobial stewardship intervention, they have been shown to decrease mortality in patients with bloodstream infections<sup>3</sup>
- The BioFire<sup>®</sup> FilmArray<sup>®</sup> Pneumonia Panel (BFPP) is a syndromic multiplex PCR assay able to identify 26 targets and 8 antimicrobial resistance genes in 75 minutes
- The assay is validated for sputum, bronchoalveolar lavage (BAL), mini-BAL, and endotracheal aspirates (ETA)
- Recent evidence has shown that early de-escalation is possible in up to 70% of cases when BFPP is utilized<sup>4</sup>
- Data on the actual impact of the BFPP on clinical and antimicrobial stewardship outcomes are lacking

## Table 1. Targets Identified by BFPP

Bacteria		Viruse
Semi-quantitative (1+, 2+)	Qualitative (detected/n	ot dete
Acinetobacter calcoaceticus Acinetobacter baumannii Enterobacter cloacae Escherichia coli Haemophilus influenzae Klebsiella aerogenes Klebsiella oxytoca Klebsiella pneumoniae Moraxella catarrhalis Proteus spp. Pseudomonas aeruginosa Serratia marcescens Staphylococcus aureus Streptococcus agalactiae Streptococcus pneumoniae Streptococcus pyogenes	Chlamydia pneumoniae Legionella pneumophila Mycoplasma pneumoniae Resistance genes KPC NDM IMP VIM OXA-48 CTX-M mecA/mecC, MREJd	Adenc Coron Huma Rhinov Influer Parain Respir

## Impact of a Rapid Diagnostic Assay for the Detection of Bacterial and Viral Agents on Antimicrobial use in Critically III Patients with Pneumonia

### ected)

- ovirus
- navirus
- an metapneumovirus
- ovirus/enterovirus
- nza A and B
- nfluenza virus
- iratory syncytial virus

## METHODS

### **Design**

Retrospective, single-center, pre-post study

- 28, 2019
- Feb 28, 2022

### Respiratory culture

## **BASELINE CHARAC**

### Variable

Age, y, mean ± SD APACHE II Score, median [IQR] Male, no. (%) Specimen Type, no. (%) BAL Mini-BAL ETA Pneumonia Type, no. (%) CAP HAP VAP

Immunocompromised. no. (%) COPD. no. (%)

## RESULTS

Outcome (median, IQR)	<b>Pre (n = 80)</b>	Post (n = 83)	P-value
TTOT, hours	38 [15-44]	21 [8-45]	< 0.001
TTET, hours	5.7 [0.8-28]	4.9 [2.7-7]	0.106
Anti-MRSA DOT, days	1.9 [0.9-3.2]	0.9 [0.6-2.7]	< 0.001
Anti-pseudomonal DOT, days	4.4 [2.1-6.8]	2.1 [0.9-6.1]	< 0.001

Pre-implementation: Dec 1, 2018-Feb

• Post-implementation: Dec 1, 2021-

### **Inclusion Criteria**

- Admitted to an intensive care unit
- Confirmed, or strong clinical suspicion for bacterial pneumonia
- Respiratory culture obtained from
- BAL, mini-BAL, or ETAs

BFPP and pathogen ID

**EPIC** notification of result to ICU pharmacist

## **Figure 1. BFPP Workflow**

TERISTICS				
	Pre (n = 80)	Post (n = 83)	P-value	
	57±15	57±17	0.8	
	21 [16-26]	19 [13-27]	0.08	
	47 (59)	48 (58)	0.1	
	21 (26)	5 (6)	< 0.01	
	32 (40)	38 (45)	0.7	
	27 (34)	40 (48)	0.04	
	27 (34)	21 (25)	< 0.01	
	47 (59)	23 (28)	< 0.01	
	6 (7)	40 (47)	< 0.01	
	12 (15)	8 (10)	0.4	
	25 (33)	17 (20)	< 0.01	

## CONCLUSION

patients with pneumonia.

## EFERENCES

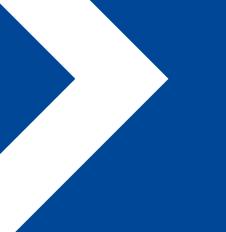
- Chest. 1999 Feb;115(2):462-74.
- Crit Care Med. 2006 Jun;34(6):1589-96.
- Clin Infect Dis. Jan 1 2017;64(1):15-23. J Clin Microbiol. Jun 24 2020;58(7)



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### **Exclusion Criteria**

- Active febrile neutropenia
- Known or suspected fungal or mycobacterial pneumonia
- Died within 48 hours of BFPP
- Cystic fibrosis or bronchiectasis



ICU pharmacist intervention

## UTCOMES

### **Primary Outcome**

• Time from respiratory culture collection to receipt of optimal antimicrobial therapy (TTOT)

### **Secondary Outcomes**

- Time from respiratory culture collection to receipt effective antimicrobial therapy (TTET)
- Duration of therapy (DOT) for antipseudomonal and anti-MRSA agents from respiratory culture collection

Implementation of a rapid multiplex PCR panel along with ICU pharmacist intervention significantly reduced the time to optimal therapy in critically ill

