MOBILIZING NON-STEWARDS TO STEWARD

A RAPID DIAGNOSTIC SUCCESS STORY

JESSICA MCDONALD, PHARMD
LEXIE LINDNER, PHARMD, BCEMP, BCCCP
AMANDA HOLYK, PHARMD, MBA, BCCCP

OBJECTIVE

Develop a plan for implementation of a rapid blood culture identification panel, without needing significant ongoing active involvement for sustained effect

MOUNT NITTANY MEDICAL CENTER

- 260 bed community teaching hospital
- Dedicated Antimicrobial Stewardship Pharmacist position (0.6 FTE)
- Utilize Infectious Diseases telemedicine services

01

BACKGROUND

Implementation of a rapid blood culture identification (BCID) panel

PRIOR LITERATURE AND AIM

- **Prior study results**
  - Reduction in time to optimal antimicrobial therapy
  - Reduced overall days of therapy
  - Majority of studies had direct involvement of ID or ASP team members

- **Our study**
  - Determine if intensive initial education efforts by the ASP could produce both a significant and a sustained impact on reduced time to optimal therapy without direct involvement from ID or ASP

02
METHODS

- Retrospective chart review of patients with a positive blood culture(s) for *Escherichia coli* or *Klebsiella pneumoniae* two years pre- and two years post-BCID panel implementation
  - Pre-BCID: April 1, 2020 – March 31, 2022
  - Post-BCID: October 1, 2022 – September 30, 2024

- Exclusions
  - ID consult
  - ASP involvement
  - Resistance gene detection
  - Broader Gram-negative coverage indicated
  - Positive blood culture in the past 72 hours
  - No inpatient admission or blood culture resulted after discharge

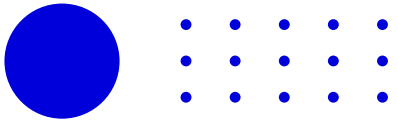
METHODS

Ceftriaxone susceptibility 2019 - 2023

	2019	2020	2021	2022	2023
E. coli	93 %	99 %	99 %	93 %	93 %
Klebsiella pneumoniae	95 %	99 %	99 %	94 %	93 %

METHODS

- **Primary endpoint**
  - Proportion of patients on ceftriaxone or narrower spectrum therapy within 24 hours of the positive blood culture result
- **Secondary endpoints**
  - Proportion never broader than ceftriaxone
  - Proportion on ceftriaxone or narrower spectrum within 48 hours
    - Average time to ceftriaxone or narrower spectrum
- **Subgroup analysis**
  - Post-BCID Year 1 versus Year 2



03

RESULTS

TOTAL OF 223 PATIENTS

- PRE-BCID: 129
- POST-BCID: 94

BASELINE CHARACTERISTICS

	Pre-BCID	Post-BCID	*p*-value
E. coli	82.2 %	83.0 %	0.875
Klebsiella pneumoniae	17.8 %	17.0 %	
Male	34.1 %	24.5 %	0.121
Female	65.9 %	75.5 %	
Age (average)	72	70	0.408
BMI (average)	30.3 kg/m^2	27.8 kg/m^2	**0.025**
Beta-lactam allergy/ADR	23.3 %	17.0 %	0.256
Severe beta-lactam allergy	4.7 %	1.1 %	0.129
Vasopressor requirement	15.5 %	12.8 %	0.565
Intensivist consult	17.1%	17.0%	1

Similar between groups

BMI difference is not likely clinically significant

PRE- VS. POST-BCID

All	Pre-BCID (n = 129)	Post-BCID (n = 94)	*p*-value
Never broader than ceftriaxone	27.1 %	45.7 %	**0.004**
Ceftriaxone or narrower w/in 24 hours	29.5 %	70.2 %	**< 0.001**
Ceftriaxone or narrower w/in 48 hours	58.1 %	91.5 %	**< 0.001**
Ceftriaxone or narrower w/in 48hr	**(n = 75)**	**(n = 86)**	
Hours to ceftriaxone or narrower (average)	19.5 hr	11 hr	**0.034**
In-hospital mortality or discharge to hospice	4 %	1.2 %	0.249
De-escalated from broader than ceftriaxone w/in 48hr	**(n = 40)**	**(n = 43)**	
Pharmacist driven de-escalation	45 %	41.9 %	0.773

POST-BCID YEAR 1 VS YEAR 2

All	Year 1 (n = 56)	Year 2 (n = 38)	*p*-value
Never broader than ceftriaxone	44.6 %	47.4 %	0.795
Ceftriaxone or narrower w/in 24 hours	75 %	63.2 %	0.218
Ceftriaxone or narrower w/in 48 hours	94.6 %	86.8 %	0.184
Ceftriaxone or narrower w/in 48hr	**(n = 53)**	**(n = 33)**	
Hours to ceftriaxone or narrower (average)	10.3 hr	12.2 hr	0.968

04

DISCUSSION

THE POST-BCID GROUP WAS SIGNIFICANTLY IMPROVED AND THE EFFECT WAS SUSTAINED PAST ONE YEAR

DISCUSSION

- A difference in poor patient outcomes was not observed
- Education efforts for both providers and pharmacists were effective
- Non-ASP pharmacists played a significant role in de-escalation

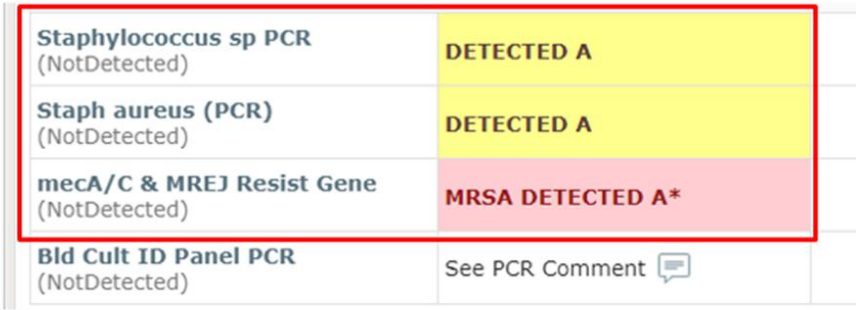
05

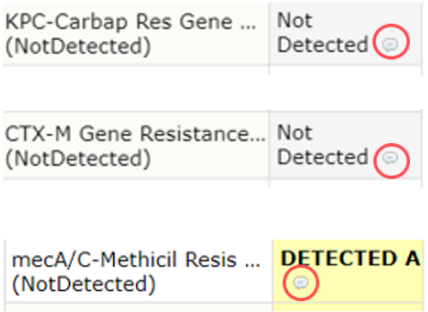
INITIAL & ONGOING EFFORTS

EXTENSIVE INITIAL AND MINIMAL ONGOING EFFORTS WERE UNDERTAKEN

INITIAL EFFORTS – COLLABORATION WITH LABORATORY

- EMR changes





IMP, KPC, OXA-48, NDM, VIM are markers for carbapenem resistance in gram negative pathogens

Marker for the most common extended spectrum beta lactamases (ESBL) found in gram negative bacteria. A negative result does not exclude the presence of other ESBL enzymes.

Marker for methicillin/oxacillin resistance in non-*S.aureus* Staphylococci (only reported for *S. epidermidis* and *S. lugdunensis*

- BCID guidance document
  - Added as a direct link for providers and pharmacists to access in the EMR

INITIAL EFFORTS – GUIDANCE DOCUMENT

Table 1. BCID Result Interpretation and Recommended Therapy

BCID Result	Preferred Treatment Regimen	Considerations
Gram Negative Pathogens		
E. coli	CTX-M negative: Ceftriaxone *See Table 2 if resistance genes are present	Ceftriaxone 91% susceptible (all isolates), 99% susceptible (non-ESBL isolates)
Klebsiella pneumoniae group	CTX-M negative: Ceftriaxone *See Table 2 if resistance genes are present	Ceftriaxone 87% susceptible (all isolates), 99% susceptible (non-ESBL isolates)

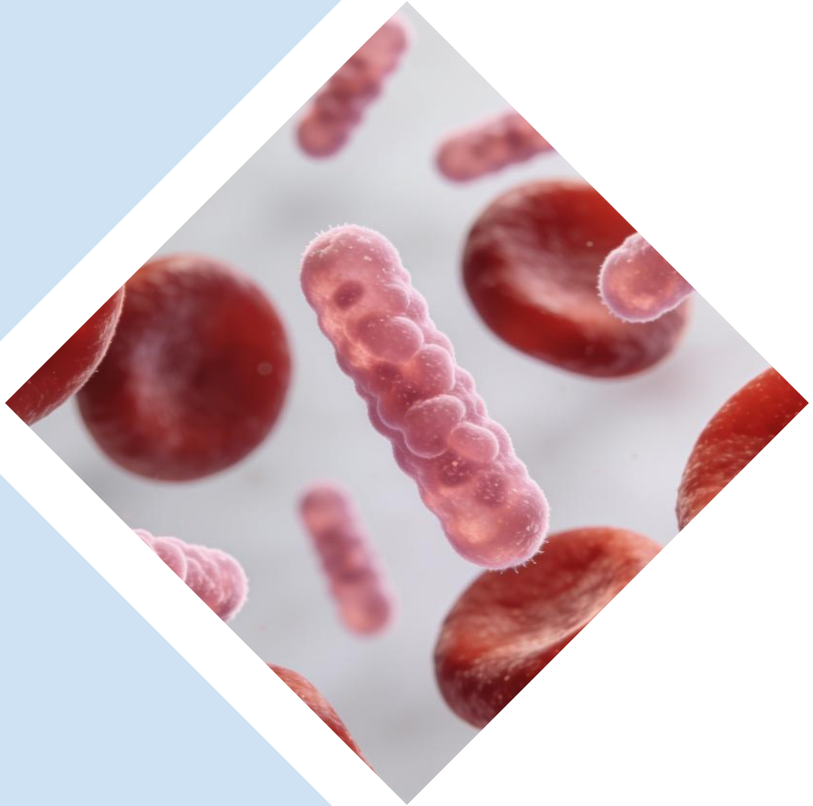
INITIAL EFFORTS – GUIDANCE DOCUMENT

Table 2. Resistance Gene Interpretation

Resistance Gene Detected	Resistance	Example
mecA/C only	Methicillin	MRSE
mecA/C and MREJ	Methicillin in *S. aureus*	MRSA
vanA/B	Vancomycin	VRE
KPC, IMP, OXA-48, NDM, VIM	Carbapenem	CRE
CTX-M	Extended spectrum beta-lactamase	ESBL *E. coli*

INITIAL EFFORTS – EDUCATION

- Presentations
  - Emergency medicine, critical care, and internal medicine
- Online learning module
  - Providers, pharmacists, and nurses
- Direct provider feedback post go-live



ONGOING EFFORTS

- ASP pharmacist review of BCID results (now 32 hours / week)
- New provider education
  - Online learning module
  - Hospitalist orientation
  - Resident orientation
- Annual pharmacist competency

ASSESSMENT

Which of the following can be utilized for successful stewardship using a BCID test?

a. EMR changes

b. A guidance document

c. Provider and pharmacist education

d. All of the above

ASSESSMENT

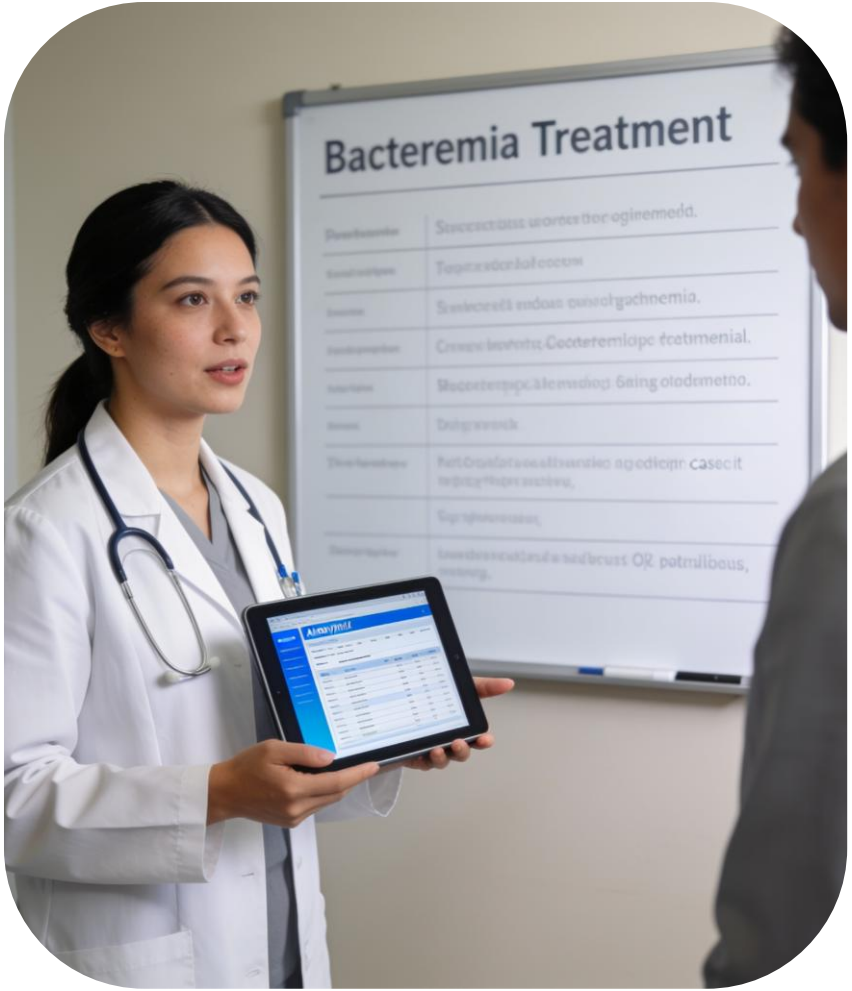
Which of the following can be utilized for successful stewardship using a BCID test?

a. EMR changes

b. A guidance document

c. Provider and pharmacist education

d. All of the above



06

CONCLUSION

ASPS CAN PRODUCE A SIGNIFICANT AND SUSTAINED IMPROVEMENT USING BCID, WITH INITIAL PREPARATORY EFFORTS AND MINIMAL ONGOING ACTIVE INVOLVEMENT.

THANKS

Would you like copies of our educational materials?

Scan the QR code or contact us via email to request.

Amanda.Holyk@mountnittany.org