Outcomes associated with utilization of methicillin-resistant *Staphylococcus aureus* (MRSA) nasal polymerase chain reaction (PCR) assay to de-escalate vancomycin therapy in patients with suspected pneumonia at a rural community hospital

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INTRODUCTION

- Vancomycin is frequently initiated empirically for patients with suspected MRSA CAP
- The MRSA nasal PCR has a negative predictive value (NPV) of 99.2% at ruling out MRSA pneumonia[3]
- Antimicrobial stewardship pharmacists and physicians have an opportunity to decrease vancomycin utilization via the MRSA nasal PCR
- De-escalation of vancomycin may lead to decreased length of stay (LOS) as patients can be shown to be stable on other antibiotics that can easily be switched to oral
- An antimicrobial stewardship initiative began in July of 2018, at Waynesboro Hospital, which included:
  - Pharmacist education about NPV of MRSA PCR assay
  - Instruction to recommend a MRSA nasal PCR in patients on vancomycin for CAP
  - Instruction to request for discontinuation of vancomycin if PCR results are negative
- There is little to no data available on outcomes associated with this type of stewardship intervention

OBJECTIVES

To determine if implementation of a targeted antimicrobial stewardship initiative utilizing the MRSA nasal PCR assay to deescalate vancomycin in patients with pneumonia influences:

Primary Outcome

- Length of stay (with cost analysis)

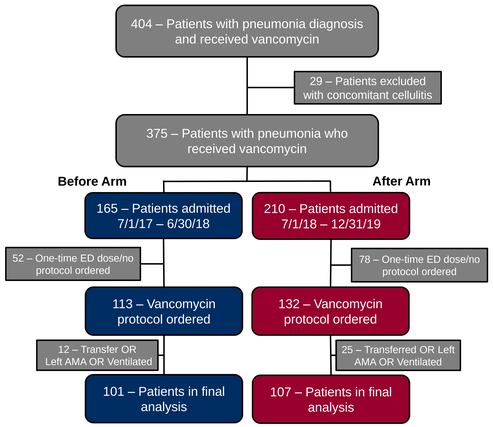
Secondary Outcomes

- Vancomycin days of therapy (DOT)
- 30-day readmission
- 30-day mortality

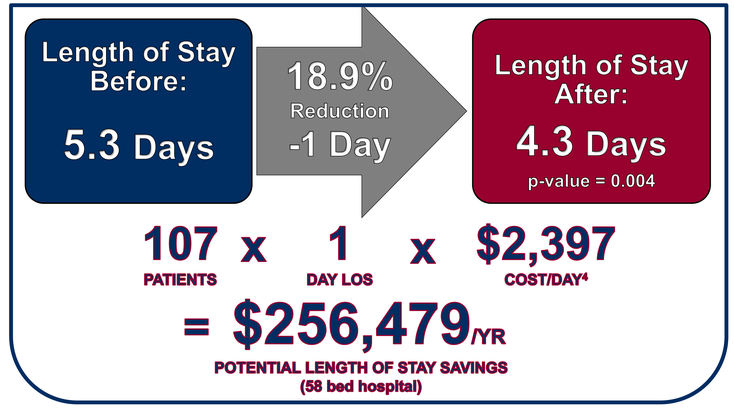
METHODS

- Single center, non-controlled, before and after study at a 58-bed community hospital located in south central Pennsylvania
- Inclusion Criteria: Patients >18 years of age, pneumonia, vancomycin protocol ordered
- Exclusion Criteria: skin and skin structure infections, transferred to another facility, left AMA, intubated
- Patients were separated into two arms:
  - Before nasal MRSA PCR stewardship initiative arm (1 July, 2017 - 30 June, 2018)
  - After nasal MRSA PCR stewardship initiative arm (1 July, 2018 - 31 Dec, 2019)
- CURB-65 calculated using vitals within first 4 hours of the visit
- This study was approved by the institutional review board at WellSpan Health

RESULTS

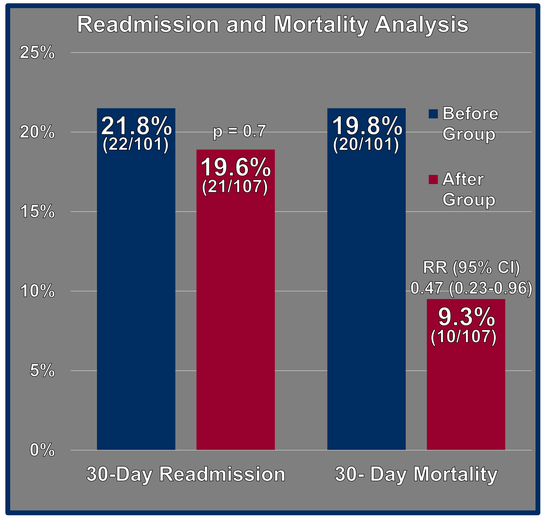


Patient Characteristics	Before Group (7/1/17-6/30/18) (n=101)	After Group (7/1/18-12/31/19) (n=107)
Male (%)	60.4	53.3
Age (Years)	73.8	73.1
CURB-65	2.57	2.52



	n	LOS	DOT	30 Day Readmit	30 Day Mortality	CURB 65
MRSA (-)	53	5.9	3.4	22.6%	24.5%	2.8
MRSA (-)	69	4.4	1.7	20.3%	10.1%	2.9
MRSA (-) w/ intervention	48	3.7	1.4	22.9%	12.5%	2.9
MRSA (+)/ no PCR	48	4.7	2.9	20.8%	14.6%	2.3
MRSA (+)/ no PCR	38	4.1	2.4	18.4%	7.9%	1.9
All	101	5.3	3.2	21.8%	19.8%	2.6
All	107	4.3	2.0	19.6%	9.3%	2.5

Before Group After Group



CONCLUSIONS

- 101 in the before group and 107 in the after group
- 48 documented pharmacist de-escalations out of 69 (70%)
- Patients similar in age and CURB-65 score
- Average patient LOS decreased from 5.3 days to 4.3 days, this was statistically significant (p = 0.004)
- DOT decreased from 3.2 days to 2.0 days (1.2 day reduction), statistically significant (p < 0.001)
- 30-day mortality were lower in the after group (RR, 0.47; 95% CI, 0.23-0.96)
- 30-day readmission rates similar between the before and after groups (p = 0.7)
- Significant decrease in vancomycin DOT and LOS
- Unexpected significant decrease in mortality which needs further investigation
- Decrease in LOS would have large cost savings benefits
- PCR MRSA stewardship utilization appears to be beneficial

FUTURE RESEARCH

- Investigate potential explanations for the significant 30-day mortality difference between the two groups
  - A lack of atypical coverage upon initiating antimicrobial therapy may have caused increased mortality in the before group, atypical coverage was often added as vancomycin was deescalated in the after group.
- A controlled prospective study could be performed to further confirm the significance of this intervention

AUTHOR DISCLOSURES

All authors have nothing to disclose

REFERENCES

1. Metlay JP, Waterer GW, Long AC, et al. Diagnosis and treatment of adults with community-acquired pneumonia. *Am J Respir Crit Care Med.* 2019; 200(7): DOI: 10.1164/rccm.201908-1581ST.
2. Centers for Disease Control and Prevention. Antibiotic prescribing and use in doctor's offices. (https://www.cdc.gov/antibiotic-use/community/about/should-know.html). Date reviewed: 31 October 2019. Date Accessed: 18 November 2019.
3. Dangerfield B, Chung A, Webb B, et al. Predictive value of methicillin-resistant *Staphylococcus aureus* (MRSA) nasal swab PCR assay for MRSA pneumonia. *Antimicrob Agents Chemother.* 2014;58(2):859-64.
4. Hospital Adjusted Expenses per Inpatient Day. KFF. (https://www.kff.org/health-costs/state-indicator/expenses-per-inpatient-day). Updated 2017. Accessed 25 November 2019.