116. Leveraging the Use of the PCR-based Methicillin-Resistant Staphylococcus aureus (MRSA) Nasal Swab in the Emergency Department to Optimize Vancomycin Use in the Inpatient Setting

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Session: P-4. Antimicrobial Stewardship: Diagnostics/Diagnostic Stewardship

Background: The MRSA nasal swab has been shown to have a negative predictive value of 97–100% for an MRSA infection. Therefore, a negative MRSA swab can be an important antimicrobial stewardship tool to stop unnecessary empiric anti-MRSA therapy. Prolonged anti-MRSA therapy may increase hospital length stay, adverse effects, antimicrobial resistance, and increase the risk of acute kidney injury. Timely obtainment of the MRSA nasal swab is paramount to prevent these complications. To improve the timely collection at our institution, we linked the MRSA nasal swab order with the initial order for vancomycin in the ED using the electronic medical record.

Methods: This was a single-center, retrospective review of adult ED patients (≥ 18 years) who recieved vancomycin at Yale New Haven Hospital, New Haven, CT, USA and had an MRSA nasal swab collected. The pre-intervention cohort were patients who met inclusion criteria between September 2018 and October 2018. The post-intervention cohort, following the linking of the MRSA nasal swab with the vancomycin order included patients between June 2019 and July 2019. The primary endpoint was the time from the ED visit to vancomycin discontinuation in patients with a negative MRSA nasal swab. The secondary endpoint was a comparison of inpatient vancomycin usage before and after implimentation of the intervention.

Results: In the pre-intervention cohort 665 patients were reviewed with 100 meeting inclusion criteria and in the post-intervention cohort 242 patients were reviewed with 100 meeting inclusion criteria. Baseline demographic characteristics were similar between the two cohorts. For the primary endpoint, the time from ED visit until vancomycin discontinuation was 61 hours in the pre-intervention cohort versus 34 hours in the post-intervention cohort (p< 0.001). The secondary endpoint of the impact of the intervention on vancomycin usage is depicted figure attached.

Vancomycin IV Days of Therapy/1000 Patient Days Before and After Intervention
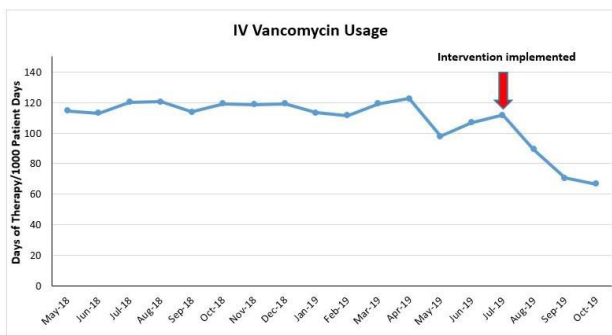
Conclusion: Linking the MRSA nasal swab order with the order for vancomycin in the ED led to a significantly shorter time of empiric vancomycin which in turn resulted in an overall reduction in the use of vancomycin.

Disclosures: **All Authors**: No reported disclosures

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117. Natural Language Processing: An Automated Alternative to Determining Inappropriate Group A Streptococcal Testing

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Session: P-4. Antimicrobial Stewardship: Diagnostics/Diagnostic Stewardship

Background: Acute pharyngitis is one of the most common causes of pediatric health care visits, accounting for approximately 12 million ambulatory care visits each year. Rapid antigen detection tests (RADTs) for Group A *Streptococcus* (GAS) are one of the most commonly ordered tests in the ambulatory settings. Approximately 40–60% of RADTs are estimated to be inappropriate. Determination of inappropriate RADT frequently requires time-intensive chart reviews. The purpose of this study was to determine if natural language processing (NLP) can provide an accurate and automated alternative for assessing RADT inappropriateness.

Methods: Patients ≥ 3 years of age who received an RADT while evaluated in our EDs/UCCs between April 2018 and September 2018 were identified. A manual chart review was completed on a 10% random sample to determine the presence of sore throat or viral symptoms (i.e., conjunctivitis, rhinorrhea, cough, diarrhea, hoarse voice, and viral exanthema). Inappropriate RADT was defined as either absence of sore throat or reporting 2 or more viral symptoms. An NLP algorithm was developed independently to assign the presence/absence of symptoms and RADT inappropriateness. The NLP sensitivity/specificity was calculated using the manual chart review sample as the gold standard.

Results: Manual chart review was completed on 720 patients, of which 320 (44.4%) were considered to have an inappropriate RADT. When compared to the manual review, the NLP approach showed high sensitivity (se) and specificity (sp) when assigning inappropriateness (88.4% and 90.0%, respectively). Optimal sensitivity/specificity was also observed for select symptoms, including sore throat (se: 92.9%, sp: 92.5%), cough (se: 94.5%, sp: 96.5%), and rhinorrhea (se: 86.1%, sp: 95.3%). The prevalence of clinical symptoms was similar when running NLP on subsequent, independent validation sets. After validating the NLP algorithm, a long term monthly trend report was developed.

Figure: Inappropriate GAS RADTs Determined by NLP, June 2018-May 2020
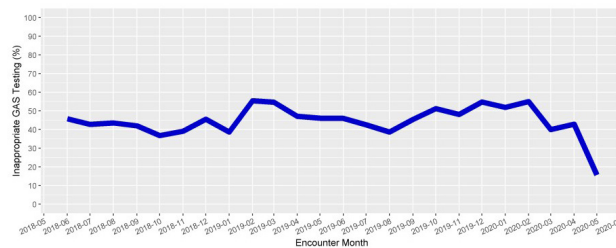
Conclusion: An NLP algorithm can accurately identify inappropriate RADT when compared to a gold standard. Manual chart review requires dozens of hours to complete. In contrast, NLP requires only a couple of minutes and offers the potential to calculate valid metrics that are easily scaled-up to help monitor comprehensive, long-term trends.

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118. Optimizing the management of coagulase-negative staphylococci (CoNS) contaminants by reporting the species name

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Session: P-4. Antimicrobial Stewardship: Diagnostics/Diagnostic Stewardship

Background: CoNS are common isolates in blood cultures (BCx), but many are contaminants contributing to unnecessary antibiotic use. When CoNS are isolated from multiple BCx, different species and/or different susceptibility patterns may suggest contamination. Species reporting of CoNS is not performed at all hospitals. The purpose of this study was to characterize antibiotic use attributable to CoNS positive (pos) BCx and determine if reporting CoNS species could help reduce unnecessary antibiotics.

Methods: A retrospective chart review was conducted of inpatients at an academic medical center before (Jan-June 2017) and after (Sept 2019-Feb 2020) implementation of CoNS species reporting. CoNS species were hidden to providers in the before group. Patients (pts) ≥18 years old with ≥1 BCx pos for CoNS were included. Pts who were neutropenic, treated with anti-staphylococcal antibiotics (SAbx) for a non-CoNS infection, or treated for CoNS with non-SAbx were excluded. Pts were categorized by number of pos BCx (1 vs ≥2). In each period, a random sample of pts was screened until 50 pts with 1 CoNS pos BCx were included. Additional data were collected until at least 50 pts with ≥2 pos BCx were included in each period. The primary outcome was use of SAbx among pts in each group before and after species reporting. Additional analyses were performed to compare the use of SAbx among subsets with same/different species and/or susceptibilities.

Results: 203 pts were included, 102 before and 101 after. 51% and 50% had ≥2 pos BCx in the before and after groups, respectively. *S. epidermidis* was isolated more frequently in pts with ≥2 pos BCx (75% vs 50%, p< 0.001). 77% of pts received at least 1 SAbx (97% vancomycin). Median SAbx days of therapy per pt (DOTs) was greater among pts with ≥2 pos BCx (1 vs 5, p< 0.001). There was no difference in overall DOTs between the two periods (3 vs 2, p=0.25). However, among pts with ≥2 pos BCx, median DOTs was less in the after period (6.5 vs 3, p=0.016). Among pts with 1 pos BCx, median DOTs was 1 in both periods.

Median Anti-Staphylococcal Antibiotic Days of Therapy per Patient (≥ 2 positive cultures)

		Species					
		Same			Different		
		Before	After	*p*-value	Before	After	*p*-value
Susceptibilities	Same	7.5 (n=22)	5.0 (n=24)	0.24	5.5 (n=6)	1.0 (n=6)	0.18
	Different	5.0 (n=13)	1.0 (n=11)	0.09	6.0 (n=11)	2.5 (n=10)	0.48

Conclusion: CoNS species reporting was associated with decreased SAbx use for pts with ≥2 pos BCx, suggesting that knowing the species helps in determining

likelihood of true infection. Institutions may realize improved stewardship metrics of SAbx by implementing CoNS species reporting for pos BCx.

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119. Procalcitonin to Guide Antibiotic Therapy for Respiratory Infection: A Systematic Review of Systematic Reviews

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Session: P-4. Antimicrobial Stewardship: Diagnostics/Diagnostic Stewardship

Background: Antimicrobial resistance is an international calamity; closely linked to antibiotic use. Safely reducing antibiotic course length and overall use are imperative. Procalcitonin (PCT) is a biomarker expressed in serum in response to bacterial infection. Systematic reviews (SRs) evaluating PCT as an adjunct to guide antibiotic therapy have been performed but its use remains contentious. The aim of this SR of SRs was to evaluate the extent to which PCT impacts the likelihood of antibiotic initiation and antibiotic duration in cases of respiratory infection.

Methods: A systematic search of databases using an *a priori* strategy was conducted. SRs which reported an outcome related to antibiotic initiation and/or duration in the context of respiratory infection were included. Data extraction was performed by the first author and checked independently by a second author. The quality of SRs was assessed by two authors independently using ROBIS criteria. Disagreements were resolved by consensus with a third author. Results are presented narratively and in tabular format (Table 1 and Table 2).

Results: 13 SRs were included (see PRISMA diagram). The number of respiratory patients included in these SRs ranged from 308 to 6708 (median = 3457). There was a consistent finding of a statistically significant reduction in antibiotic initiation in the PCT study group compared to the control group (Table 1). SRs that meta-analysed antibiotic duration (n = 9) as a difference in days showed a median reduction of 2.15 days (reduction range 0.80 to 3.83 days) with PCT use.

PRISMA Diagram

PRISMA 2009 Flow Diagram
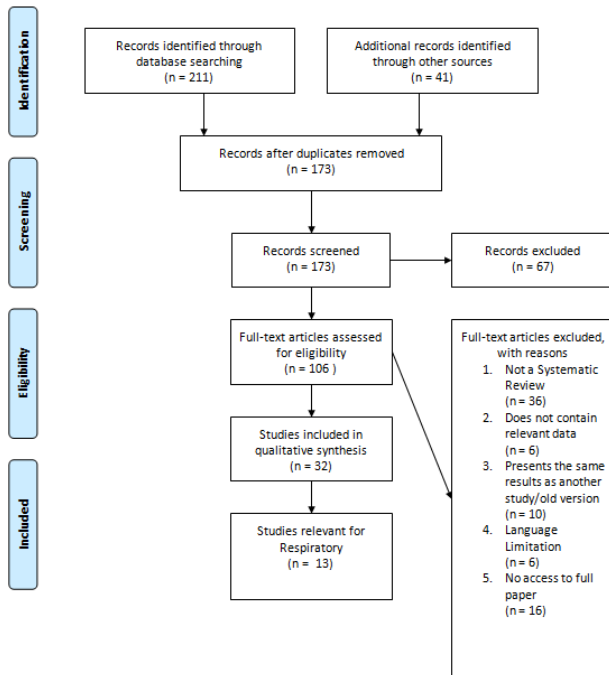
From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit www.prisma-statement.org.

Table 1: Summary of odds ratios/ risk ratios in antibiotic initiation with the use of PCT

Year	First Author	Type	Number of studies	Number of participants	Antibiotic Initiation OR/RR in PCT group versus control (a = OR, b = RR)	p-value
2011	Li H	SR and Meta-analysis (MA)	7	3431	0.69 (0.55 to 0.88) b	p=0.03
2015	Westwood M	SR and MA	9	3637	0.77 (0.68 to 0.87) (adults) b	Not given
2017	Ibrahim WH	SR and MA	4	457	0.58 (0.50-0.67) b	p<0.00001
2017	Mathioudakis AG	SR and MA	7	974	0.56 (0.43 to 0.73) b	p<0.0001
2017	Schuetz P	SR and MA	26	6708	0.27 (0.24 to 0.32) a	p<0.001
2017	Odermatt J	SR and MA	2	644	0.2 (0.1 to 0.3) a	p<0.0001
2018	Lin C	SR and MA	4	679	0.26 (0.14 to 0.50) a	p<0.0001
2018	Hey J	SR and MA	10	3912	0.26 (0.13 to 0.52) a	p<0.001

Table 2: Summary of difference in antimicrobial duration with use of PCT

First Author	Type	Year	Overall number of studies	Overall number of participants	Duration Given Difference (Mean/Median Days)	Given P-value
Li H	SR and MA	2011	7	3223	-1.27	p<0.001
Pugh R	SR and MA	2012	3	308	-3.20	p<0.00001
Soni NJ	SR and MA	2013	7	3284	-2.35	p=0.02
Westwood M	SR and MA	2015	9	3637	-0.80	Not given
Mathioudakis AG	SR and MA	2017	6	776	-3.83	Not given
Schuetz P	SR and patient data MA	2017	26	6708	-1.83	p<0.001
Odermatt J	SR and Patient data level MA	2017	2	644	-2.4	p<0.001
Hey J	SR and MA	2018	9	3704	-2.15	p<0.001
Wirz Y	Patient Level SR and MA	2018	11	2203	-1.36	p=0.582

Conclusion: PCT use leads to a reduction in antibiotic initiation for respiratory diseases. It also results in a decrease in antibiotic duration, but this finding was not consistently statistically significant. There are no data presented in the SRs about the impact of this on antimicrobial resistance.

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120. Stewardship Driven Reduction of Inappropriate Clostridioides difficile Testing at a Tertiary Military Medical Facility

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Session: P-4. Antimicrobial Stewardship: Diagnostics/Diagnostic Stewardship

Background: *C. difficile* infection (CDI) is the leading hospital associated (HA) infection in an era of antibiotic overuse and highly-sensitive PCR-based diagnostics. PCR does not differentiate CDI versus colonization making over-reporting a concern. HA-CDI can impact hospital reimbursement, lead to unnecessary treatment, increase costs and length of stay. Our aim was to implement an intervention to target inappropriate *C. difficile* (CD) testing.

Methods: Two-tiered testing is not utilized at our facility. After provider education on guidelines for appropriate CD testing, prompts were introduced into the electronic medical record (EMR) for CD test orders. At order input, providers are prompted to answer "yes" or "no" to two questions; 1) receipt of stool softeners within the preceding 48 hours and 2) criteria of 3 loose stools within 24 hours. The test order was completed regardless of the responses to the prompted questions. Six-month post-intervention data was compared to the same timeframe during the year prior.

Results: A total of 334 and 236 tests were ordered in the pre- and post-intervention periods respectively. Accounting for inpatient bed days, the incidence reduction rate (IRR) was 0.75 (CI 0.63–0.89, p < 0.001) corresponding to an estimated hospital cost-savings of $12,250 based on testing costs alone. The majority of CD tests were ordered by IM providers, who also demonstrated the greatest reduction in tests ordered post-intervention. Patient characteristics were analyzed in the pre- and