Conclusion: DST is highly accurate at identifying susceptibility to antibiotics for many bug-drug combinations in pediatric blood culture isolates, but its ability to identify non-susceptibility is less robust. The observed spectrum of prescribed antibiotics was narrower after DST results, suggesting some clinicians may be using the result to de-escalate therapy. DST may be a useful low-cost tool for antimicrobial stewardship.

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98. Clinical and Pharmacoeconomic Impact of Rapid Diagnostic Pneumonia Panel in Critically Ill Patients Admitted with Nosocomial Pneumonia
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Session: P-4. Antimicrobial Stewardship: Diagnostics/Diagnostic Stewardship

Background: Rapid identification of causative organisms and tailored antibiotic therapy is essential to improving patient outcomes in critically ill patients with nosocomial pneumonia (NP). The BioFire FilmArray Pneumonia Panel (BFPP) can identify and semi-quantify the causative organisms via PCR. However, there is limited evidence of its implementation and utility within antimicrobial stewardship program (ASP) in managing NP.

Methods: This was an IRB-approved retrospective pre- and post-interventional study at an acute care hospital. Critically ill patients were included in the intervention group (IG) with a confirmed diagnosis of NP and had BFPP performed. Patients in IG were matched on a 2:1 ratio to a comparator group (CG) who did not receive BFPP. The primary endpoint was clinical cure (CC), defined as: 1) resolution of symptoms and/or leukocytosis; or 2) radiographic improvement; or 3) expression of CC by the infectious disease physician. Secondary endpoints include time to escalation, de-escalation, or discontinuation of antibiotics, and in-patient mortality (IM). In addition, a pharma-economic analysis of the utilization of this panel was conducted.

Results: There were 52 patients evaluated, of which 26 were included in IG and 13 were matched to be included in CG. Demographics were similar between the two groups. No difference in CC was observed between IG and CG (38.5% vs 38.5%, p = 1). However, when evaluating ASP interventions, more patients in IG had de-escalation (53.8% vs 15.4%, p = 0.01) and discontinuation (50% vs 7.7%, p = 0.003) performed compared to CG. No difference was seen in escalation of therapy (34.6% vs 30.8% NS) and IM (26.9% vs 46.2%, p = 0.27). Time to ASP intervention was quicker by 24 hours in IG vs CG (24 vs 48 hours, p = 0.01). No difference was seen in total cost of therapy between the two groups ($289,500 vs $243,705, p = 0.6). However, cost savings of $31,000 was seen in total cost of ICU care in IG vs CG ($144,800 vs $175,800, p = 0.032).

Figure 1: ASP Intervention

Conclusion: There was no observed impact of BFPP on CC and IM in critically ill patients. However, utilization of BFPP led to faster time to ASP interventions and higher rates of de-escalation and discontinuation of antibiotics when utilized as part of ASP. BFPP can serve to be a cost-effective option for critically ill patients.

99. Comparison of Procalcitonin Testing to a Targeted Audit-and-Feedback Strategy on Prescribed Durations of Therapy for Community-Acquired Pneumonia
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Session: P-4. Antimicrobial Stewardship: Diagnostics/Diagnostic Stewardship

Background: The procalcitonin (PCT) assay is FDA-approved to help guide antimicrobial treatment of respiratory tract infections, however, conflicting data exist regarding its impact on shortening durations of therapy. The purpose of this study was to compare the impact of PCT to a targeted audit-and-feedback (TAF) strategy on prescribed antibiotic durations of therapy for community-acquired pneumonia (CAP).

Methods: A retrospective cohort study was conducted at two community teaching hospitals, one implementing PCT with routine audit-and-feedback and one implementing a TAF strategy recommending 5 days of therapy for uncomplicated CAP. The primary objective of this study was to compare the impact of PCT implementation to TAF implementation on durations of therapy prescribed for suspected CAP. Secondary objectives included comparing length of stay, 30-day readmission, mortality, and rates of Clostridioides difficile. Adult inpatients with an antibiotic ordered with an indication of pneumonia were eligible for inclusion. Those who were critically ill, immunocompromised, had concurrent infections, were made comfort care, discharged or expired within 48 hours were excluded.

Results: 311 patients were included (Pre-TAF n=80, Pre-PCT n=80, Post-TAF n=80, Post-PCT n=71). Average duration of therapy prescribed for CAP at baseline was similar between groups, Pre-TAF 7.0 days vs. Pre-PCT 7.8 days (p=0.1). After implementation of the respective interventions, there remained no difference in the average duration of therapy between groups, Post-TAF 5.5 days vs. Post-PCT 5.4 days (p=0.8). Both PCT and TAF strategies demonstrated significant improvement in prescribed durations for CAP between their respective Pre- and Post-intervention groups (p<0.001 and p=0.002, respectively). The PCT protocol was followed 41% of the time in the Post-PCT group. There were no differences in readmission, mortality, or C. difficile between groups.

Conclusion: PCT and TAF were equally effective antimicrobial stewardship strategies in reducing total days of antibiotic therapy prescribed for CAP with no differences observed in patient outcomes.

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100. Development and Implementation of a 2-Tier Testing Algorithm for Clostridioides difficile: An Evaluation of Outcomes on Patients with Indeterminate Results at 90 Days
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Session: P-4. Antimicrobial Stewardship: Diagnostics/Diagnostic Stewardship

Background: There is no definitive gold standard for accurate diagnosis of Clostridioides difficile (C. difficile) infection. There is ample evidence that relying on a molecular test such as Polymerase Chain Reaction (PCR) for diagnosis, can lead to over diagnosis and unnecessary treatment. Combined, multi-step algorithms have been proposed to improve specificity of testing. The challenge remains in interpreting discordant or indeterminate results. Additionally, the risk of hospitalization due to lack of treatment for indeterminate results remains unclear.

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Methods: To improve C. difficile testing, a new 2-tier algorithm was implemented in 2019 starting with PCR testing. An indeterminate result was defined as a sample with a positive PCR and a positive Glutamate Dehydrogenase (GDH)/negative toxin result or a positive PCR and a negative GDH/positive toxin result.

Indeterminate results were classified by episode severity and number. Patient records were reviewed by the Antimicrobial Stewardship (AS) physician and pharmacist to determine true infection versus colonization. Treatment was given as per recent IDSA Guidelines.

All patients with indeterminate results were followed for 90 days for development of infection or hospitalization due to C. difficile.

Adults with stool samples submitted for testing between 6/1/2019 and 12/31/2019 were included. A total of 169 specimens were reviewed: 75 were positive, 72 were indeterminate (4 excluded from final analysis) and 22 were negative.

Results: Using a 2-tier testing algorithm, 68 (41%) of all results were indeterminate. Our AS classified 47 (69%) of those as infection and 21 (31%) as colonization. Patients with indeterminate results who were treated had a low incidence (8.5%) of reinfection requiring hospitalization in the following 90 days. There were no hospitalizations in the untreated group.

Of patients with an indeterminate result who were treated, 42 (89%) were categorized as an initial episode of C. difficile infection.

Conclusion: Clinical correlation of indeterminate results is critical to algorithm implementation.

A combined approach with provider education, an electronic testing advisor, a 2-tier testing algorithm, daily monitoring and prescribing by the AS team resulted in favorable outcomes for patients with indeterminate results.

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101. Diagnostic Utility of a Multiplex PCR Meningitis/Encephalitis Panel and Impact on Antibiotic Use
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Session: P-4. Antimicrobial Stewardship: Diagnostics/Diagnostic Stewardship

Background: The detection and identification of meningitis and encephalitis pathogens from CSF via traditional microbiologic methods may take several hours to days. The BioFire FilmArray Meningitis/Encephalitis Panel (BioFire), approved by the FDA in 2015, can detect 14 different pathogens within one hour, providing a faster time to diagnosis of a broad range of pathogens. The purpose of this study was to examine the impact of BioFire on length of hospital stay and duration of antibiotic use.

Methods: We conducted a retrospective chart review of patients diagnosed with meningitis and/or encephalitis between 2015 and 2019 at 3 Beaumont Health (BH) hospitals. BioFire was adopted by BH midyear in 2017, allowing for analysis of cohorts over comparable periods before and after the introduction of the panel. Data collected and analyzed included biodemographics, comorbidities, presenting signs and symptoms, CSF analysis results, pathogens, days of antibiotic therapy, length of stay, and mortality.

Results: A total of 161 patients diagnosed with meningitis and/or encephalitis were reviewed, including 59 who underwent testing via BioFire. Of the 161 patients, 68 had a pathogen identified, 50 via traditional methods (6 bacterial and 44 viral) and 18 via BioFire (3 bacterial and 15 viral). West Nile Virus accounted for 17 of the viral infections diagnosed by traditional methods or BioFire (11.2 vs 13.0 days, p=0.82) or for those with viral infections (0.1 vs 0 days, p=0.3). The median length of stay was also not significantly different between the two cohorts for patients with bacterial infections (21.7 vs 15.0 days, p=0.36) or viral infections (6.2 vs 10.0 days, p=0.1).

Conclusion: While utilization of the BioFire panel yielded a faster diagnostic result, we have no evidence to demonstrate that it contributes to a significant reduction in duration of antibiotic use or length of stay.

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102. Effects of an Antimicrobial Stewardship-guided MRSA Nasal Screening Review on Vancomycin Utilization for Respiratory Infections: A Quasi-Experimental Study
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Session: P-4. Antimicrobial Stewardship: Diagnostics/Diagnostic Stewardship

Background: Methicillin-resistant Staphylococcus aureus (MRSA) remains a significant pathogen in patients with respiratory infections. Guidelines recommend empiric MRSA coverage in patients at increased risk, resulting in substantial vancomycin use. Recent literature highlights the use of MRSA nasal assays as a rapid screening tool for MRSA pneumonia, demonstrating high negative predictive values and allowing for shorter antibiotic coverage. We aimed to evaluate the impact of MRSA nasal screening review by the antimicrobial stewardship program (ASP) on vancomycin utilization for respiratory infections.

Methods: This was a retrospective, quasi-experimental, pre-post intervention study with the addition of an MRSA screening review tool into the ASP electronic record, highlighting patients on vancomycin (actively or recently administered) with a negative MRSA screening. Vancomycin days of therapy (DOT) was collected for all orders indicated for a respiratory infection in the two weeks following a negative screening. Additional outcomes include vancomycin total dose and DOT per 1,000 patient days. Outcomes were compared via independent samples t-test.

Results: 1,110 MRSA screenings resulted across 2 months, of which the majority were excluded for either not having vancomycin ordered, or for having vancomycin ordered for a non-respiratory indication, leaving 37 and 35 evaluable screenings in the pre- and post-intervention groups, respectively. Regarding vancomycin DOT, we did not identify a significant difference between pre- and post-intervention groups with respective means of 2.45 (SD=1.52) and 2.14 (SD=1.12) (p=0.35). We identified a total 8.78 vancomycin DOT per 1,000 patient days in the pre-intervention group versus 6.69 in the post-intervention group.

Table 1. Patient Characteristics

| Pre-intervention | Post-intervention |
|------------------|-------------------|
| Unique Patients  | 33                | 35                |
| Age (years, median (IQR)) | 66 (0.0-76.0) | 61 (49.5-82.0) |
| Gender, n (%)      |                   |                   |
| Male               | 12 (36.4)         | 12 (34.3)         |
| Female             | 21 (63.6)         | 23 (65.7)         |
| Number of MRSA Screenings, n (%) | 31 (93.9) | 30 (85.7) |
| Multiple           | 2 (6.1)           | 5 (14.3)          |

Table 2. Vancomycin Utilization Following ASP-guided MRSA Screening Tool

| Vancomycin Days of Therapy, Mean (SD) | 2.45 (1.52) | 2.14 (1.12) |
| Vancomycin Dose (mg), Mean (SD)      | 3.810 (4.820) | 3.195 (7.031) |

*p values are for a respiratory infection and administered after a negative MRSA screening.

Conclusion: ASP-guided review of MRSA screenings was associated with a non-significant decrease in mean vancomycin DOT and lower total DOT per 1,000 patient days for respiratory infections following a negative screen. Given the recent implementation of our intervention, our analysis covered a small sample size, highlighting the need for continued data collection. MRSA screenings are not always fully or immediately utilized in our institution, demonstrating room to de-escalate MRSA-targeted antibiotics.

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103. Empiric Antibiotic Susceptibility Using a Traditional vs. Syndromic Antiobigram-Implications for Antimicrobial Stewardship Programs
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Background: A primary tenet of antimicrobial stewardship programs (ASPs) is to establish empiric antibiotic treatment recommendations. While traditional antibiograms are useful, intrinsic variability in susceptibility exists when stratifying by source and/or location. In contrast, a syndromic antibiogram displays the likelihood of adequate coverage for a specific infection syndrome, considering the weighted incidence of pathogens causing that syndrome. The aim of the study was to compare antibiotic susceptibilities using a traditional versus syndromic antibiogram.

Methods: Between 2016–2019, 20 US institutions per year submitted up to 250 consecutive targeted gram-negative pathogens from hospitalized patients as part of the Study for Monitoring Antimicrobial Resistance Trends (SMART). MRAs were determined by broth microdilution and interpreted using 2020 CLSI breakpoints, except for imipenem/relebactam (I/R) for which FDA breakpoints were used. The traditional antibiogram included the 3 most common Gram-negative pathogens from all sources and was represented as a percentage of critical isolates considered for empiric antibiotic coverage; the syndromic antibiogram included the 3 most commonly isolated Gram-negative pathogens from a respiratory source based on patient location.

Results: 17,561 Gram-negative isolates, including 6,654 lower respiratory isolates were evaluated. The top 3 most common Gram-negative organisms included: E. coli (n=6,095, 44%), Klebsiella spp. (n=4,097, 30%), P. aeruginosa (n=3,649, 26%). Cumulative