1579. Reduction of Antimicrobial Resistance among Gram - Negative Pathogens after Antimicrobial Stewardship in Three Tertiary Egyptian Hospitals
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Background. Antimicrobial resistance is an urgent healthcare threat. Monitoring and interventions to reduce antimicrobial resistance among Gram-negative rods (GNR) are essential.

Methods. The study was conducted over three years in three tertiary-care hospitals in Egypt during 2014-2016. It included 578 GNR isolates from intra-abdominal infections (IAI), urinary tract infections (UTI) and respiratory tract infections (RTI). Identification of isolates was done by VITEK-X, and confirmed by MALDI-TOF at a central lab. Longitudinal part of Study for Monitoring Antimicrobial Resistance Trends (SMART). Susceptibility testing and molecular studies of resistance were conducted in the hospital laboratories. Starting from 2015, an antimicrobial stewardship (AMS) program was implemented in the 3 hospitals for fluoroquinolone restriction in empirical therapy, and early de-escalation of antimicrobial therapy.

Results. In Phase 1 (before AMS), 578 isolates of Gram-negative bacilli (GNB) were studied. Enterobacteriaceae comprised 66% of the total isolates. K.pneumoniae and E.coli were the most common (29.8% and 29.4%), followed by Acinetobacter baumanii (21.1%) and Pseudomonas (9.9%). K.pneumoniae and E.coli were the predominant organisms in IAI (30.5% and 30.1% respectively) and UTI (36.8% and 46.6% respectively), while Acinetobacter baumanii was the most prevalent in RTI (40.2%). ESBL producers were phenotypically detected in 53% of K.pneumoniae, 68% of E.coli and 64% of Proteus mirabilis. Amikacin, imipenem, ertapenem and piperacillin/taizobactam were the highest susceptibility (60.7%, 38%, 49.3% and 46.5% respectively).

In Phase 2 (after AMS), 492 Gram-negative bacilli (GNB) were studied, showing similar distribution except for marked reduction in Acinetobacter baumanii(5.3% in IAI, 11.4% in RTI and 1% in UTI). ESBL continued to be high. Susceptibility to carbapenems increased to 87.1% for E.coli and 77.7% for all Enterobacteriaceae. PCR showed predominance of OXA-48 like (more than 50% and NDM (more than 40%), with low percentage of KPC2, VIM2 and IMP.

Conclusion. Our results show high ESBL and carbapenemases rates compared with the region that call for an urgent national AMS program and strict implementation of infection control measures.

Disclosures. A. El Kholy, MSD: Investigator, Research support; S. A. Girgis, MSD: Investigator, Research support; M. A. F. Shetta, MSD: Research Contractor, Research support; A. Ramadan, MSD: Investigator, Research support; D. H. AbdElHamiid, MSD: Investigator, Research support.

1580. Impact of an Antimicrobial Stewardship Initiative Focused on Staphylococcus aureus Bacteremia
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Background. Data exists to support a mortality reduction from S. aureus bacteremia with adherence to evidence-based recommendations. Therefore, our Antimicrobial Stewardship Team instituted a guideline focused on S. aureus bacteremia management. This study outlines improvements achieved through the implementation at an academic medical center.

Methods. A quasi-experimental approach evaluated pre-implementation (2014-15) and post-implementation (2015-17) periods. The Antimicrobial Stewardship Team provided a detailed standardized note and management guidelines. Adult patients with S. aureus bacteremia identified by a rapid diagnostic system were evaluated. Patients were excluded if discharged within 48 hours of a first positive blood culture or transplantation. The primary outcome was all-cause 30-day mortality and secondary outcomes were total guideline adherence (TGA) and appropriateness of therapy.

Results. Overall, 263 patients (105 pre-implementation; 158 post-implementation) were included. No significant differences were observed in baseline characteristics (e.g., age, gender, ethnicity); however, the mean Pitt Bacteremia score was significantly lower in the post-implementation group (2 vs. 1; P = 0.01). Although no difference was observed in all-cause 30-day mortality (13% vs. 15%; P = 0.8), improvement in bundle adherence (P = 0.01) and appropriateness of therapy (68% vs. 74%, P = 0.26) were noted while duration of bacteremia decreased (3.6 days vs. 2.8 days; P = 0.02) in the post-implementation period. In uncomplicated bacteremia, TGA (15% vs. 38%; P = 0.02) and adequate duration of therapy (54% vs. 77%; P = 0.02) significantly improved. In complicated bacteremia, TGA vs. 48%; P = 0.14) and targeted agents utilized (92% vs. 100%; P < 0.01) increased post-implementation. Additionally achieving TGA significantly reduced all-cause 30-day mortality in complicated (33% vs. 1.5%; P = 0.01) and uncomplicated (26% vs. 5.6%; P = 0.01) bacteremia for the entire sample.

Conclusion. The Antimicrobial Stewardship initiative significantly improved adherence to evidence-based guidelines for S. aureus bacteremia management. Though no impact on all-cause mortality was observed, a significant effect was noted when TGA was achieved.

Disclosures. All authors: No reported disclosures.

1581. The Value of Antimicrobial Stewardship Team (AST) in Conjunction with Infectious Diseases Consult in Reducing the 30-day Mortality of Patients with Staphylococcus aureus Bacteremia in a Single Academic Medical Center
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Background. Staphylococcus aureus bacteremia (SAB) is a common bloodstream infection with significant mortality. Infectious Disease consultation (IDC) has been shown to improve outcomes and adherence to standards of care (SOC). In our institution, IDC was associated with increased adherence to evidence-based guidelines for SAB management.

Methods. A retrospective, observational study of all SAB cases in adults ≥18 years old at a 1541-bed academic medical center from January 1 to December 31, 2015 was performed. Those meeting inclusion criteria underwent chart review for demographics, co-morbidities, presence of IDC or antimicrobial stewardship team (AST) input, management including follow-up blood culture, echocardiography, antibiotic choice and duration, and outcomes including relapse and 30-day mortality.

Results. 236 patients met inclusion criteria and 174 (74%) had IDC. Patient characteristics were balanced in IDC and no IDC (NIDC) groups including age, sex, co-morbidities, methicillin-resistant SAB rates except for more immunosuppressed hosts, bone and joint infections, and endocarditis (P = 0.05) in the IDC group. SOC adherence performance of echocardiogram, appropriate antibiotic choice and treatment duration were adhered to more frequently in the IDC group (P < 0.005). Relapse rates were similar in IDC and NIDC groups (3% vs. 5%, P = 0.44 respectively). Lower 30-day mortality was observed with IDC but did not reach statistical significance (11% vs. 16%, P = 0.07). Patients with malignancy who had IDC had lower 30-day mortality compared with their counterpart in the NIDC group (6% vs. 35%, P = 0.01).

In the NIDC group, 9/62 (15%) had an AST that provided recommendations on antibiotic management. When these cases were combined with those with IDC, mortality was significantly improved compared with those without either IDC or AST input (11% vs. 23%, P = 0.04). Multivariate analysis revealed bacteremia clearance within 3 days and presence of AST input or IDC were predictors of survival while age≥60 and ICU stay were predictors of mortality (P < 0.005).

Conclusion. Similar to prior studies, IDC was associated with increased adherence to standard management practices. Our study suggests that a pharmacy-driven AST can be an adjunct to IDC in improving outcomes of SAB.

Disclosures. All authors: No reported disclosures.

1582. Impact of an Unsolicited, Simple Standardized Form Based Antimicrobial Stewardship Intervention to Improve Guideline Adherence in the Management of Staphylococcus aureus Bacteremia
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Background. Staphylococcus aureus (SAB) is associated with poor outcomes. The objective was to assess the impact of a pharmacist driven antimicrobial stewardship program on SAB management.

Methods. A multicenter, pre-post quasi-experimental design was used to compare pre-intervention (Oct 2014 – Sep 2015) and intervention (Oct 2015 – Sep 2016) for patients hospitalized with SAB. The antimicrobial stewardship program (ASP) developed an evidence based SAB management bundle that included: Infectious Diseases (ID) consult, blood culture clearance, appropriate empiric and definitive anti-biotics, echocardiography, adequate treatment duration, and infectious source removal if applicable. ASP pharmacists performed prospective audit and feedback (PAF) using a standardized form after review with the ASP medical director. The primary outcome was bundle component adherence. Secondary outcomes were length of stay, 30 day readmission, in-hospital mortality, and 30 day mortality.

Results. 127 patients were included (pre-intervention = 62, intervention = 65). The two groups had similar patient demographics. The intervention group had a higher rate of complicated SAB at diagnosis. Bundle implementation with PAF resulted in significant improvements in ID consult (43% vs. 92.3%, P = 0.001), appropriate empirical antibiotic dosing (83.9% vs. 100%, P = 0.001), ordering echocardiography (72.6% vs. 93.8%, P = 0.001), and adequate treatment duration (87% vs. 100%, P = 0.009). Overall bundle adherence increased by 43.3% (P < 0.001). Readmission and 30 day mortality decreased but did not reach statistical significance.
During the intervention, ASP pharmacists made 81 recommendations (93.8% accepted).

A post hoc analysis was conducted due to the 35.8% increase in ID consults with the intervention. A significant decrease of 18.5% in in-hospital mortality (P = 0.041) and 21.7% in 30-day mortality (P = 0.009) with ID involvement was seen.

Conclusion. SAB management bundle development with PAF by ASP pharmacists significantly improved adherence rates to evidence based recommendations in SAB inpatients. This simple yet effective ASP intervention can ensure consistent management of a highly morbid infection.

Disclosures. C. Cervera, Sunovion: Scientific Advisor, Consulting fee.

1583. Impact of an Antimicrobial Stewardship Bundle of Rapid Identification of Methicillin Susceptibility and Active Intervention on Treatment of *Staphylococcus aureus* Bacteremia

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Background. *Staphylococcus aureus* bacteremia (SAB) is a major source of mortality and morbidity. Studies show rapid initiation of appropriate antibiotic therapy is essential to treatment and optimal therapy depends upon antibiotic susceptibility.

Methods. Using a quasi-experimental pre-post intervention study we evaluated a bundled antimicrobial stewardship rapid identification and susceptibility testing protocol. The pre-intervention group included all patients treated for SAB at our hospital between April and Sept 2015; the post-intervention group was between April and Sept 2016. We implemented combined rapid identification by MALDI-TOF with a modified immunochromatographic assay for penicillin-binding protein 2a to differentiate MSSA and MRSA. Sensitivity and susceptibility results were communicated to the primary team per usual protocol and to an antimicrobial stewardship pharmacist for intervention. The primary outcome was time to optimal antibiotic therapy calculated as the difference in time from the first dose of antibiotic therapy to the discontinuation time of the non-optimal antibiotic, for patients receiving combination therapy or first dose of optimal therapy, determined using a predefined protocol developed in collaboration with the Infectious Diseases (ID) consult service. Additional outcomes included time to pathogen identification, time to ID consult, time to source control, length of hospital stay (LOS), intensive care unit LOS, inpatient-days of therapy, and in-hospital mortality. Outcomes were compared using the t test, or Student’s t test for independent samples.

Results. 74 pre-intervention and 55 post-intervention patients were included. Time in days to optimal therapy (1.7 ± 1.2 vs. 2.5 ± 1.6, P = 0.003), total time to pathogen identification (1.5 ± 0.5 vs. 2.7 ± 0.6, P < 0.001) and time to ID consult (1.6 ± 1.5 vs. 2.8 ± 2.4, P = 0.001) were significantly shorter in the intervention group. All other outcomes were not statistically significantly different between groups.

Conclusion. We demonstrate significant improvement in time to pathogen identification and susceptibility testing coupled with antimicrobial stewardship pharmacist intervention.

Disclosures. E. Ernst, Merck Sharp and Dohme: Consulting, Consulting fee.

1584. Use of Diagnosis-related Group-Based Days of Therapy to Evaluate Fluoroquinolone Use Optimization Across a Large Healthcare System

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Background. Optimal use of fluoroquinolones (FQ) is a common antimicrobial stewardship program (ASP) target based on well-cited risk for *Clostridium difficile* colitis and has gained national attention in the setting of recent FDA warnings about serious side effects. Identifying appropriate metrics for benchmarking poses a significant challenge. Diagnosis-related group (DRG) can be leveraged to focus large volumes of patient data to derive DRG-based days of therapy (DOT). Novant Health identified an opportunity to improve FQ use among patients with COPD and pneumonia (PNA) across the health system and created a FQ use optimization initiative based on inter-facility data that would otherwise not have been possible using the standard DOT per 1000 patient-days (PD) metric.

Methods. A staged approach to optimizing FQ use was developed through a multidisciplinary, system-level ASP, and system-specific benchmarks for FQ use among patients with PNA and COPD DRGs were established. 10 facilities ranging in size from 60 to 900 beds were included in the intervention. We evaluated FQ use at the system and facility level using both standard (DOT/1000 PD) and novel metrics (DRG-specific DOT/1000 PD and percentage of antibiotic use attributed to FQ within each DRG). In addition to providing feedback on performance relative to other facilities, the intervention also included provider education and targeted infectious diseases pharmacist review and feedback.

Results. Percentage of FQ use among patients with PNA DRGs decreased from 20% to 9%, while use in COPD DRGs decreased from 38% to 12% over 15 months (55% and 68% reductions in FQ use, respectively). System-wide FQ utilization decreased by 38% over the same 15 month time period, from a peak of 1.14 DOT/1000 PD to 0.71 DOT/1000 PD.

Conclusion. Decreases in overall FQ utilization were influenced by DRG-specific benchmarking and inter-facility comparisons. Traditional DOT/1000 PD metrics are plagued with variance in patient characteristics (e.g., disease state with respect to severity of illness). While DRG-based metrics have inherent limitations, they can provide specific data on antibiotic use patterns to support health-system specific and evidence-based benchmarking and inter-facility comparisons.

Disclosures. All authors: No reported disclosures.

1585. Impact of an Emergency Medicine Pharmacist on Appropriate Empiric Antibiotic Prescribing for Community-Acquired Pneumonia and Intra-Abdominal Infections

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Background. Antibiotics are the second most common drug class prescribed in the Emergency Department (ED); therefore, it is critical to engage ED providers in antimicrobial stewardship programs (ASP). Emergency medicine pharmacists (EMP) can play a significant role in ASP by working with providers to choose the most appropriate antimicrobial agent, dose, and duration. This study aimed to determine the impact of an EMP on appropriate empiric antibiotic prescribing for community-acquired pneumonia (CAP) and community-acquired intra-abdominal infections (CA-IAI).

Methods. A retrospective cohort study was conducted evaluating adult patients admitted with a diagnosis of CAP or CA-IAI. The primary outcome of this study was to compare guideline-concordant empiric antibiotic prescribing when an EMP was present vs. absent. We also aimed to compare the impact of an EMP in a new ASP (2014) vs. established ASP (2016). Secondary outcomes included in-hospital mortality and hospital acquired *Clostridium difficile* infection (CDI).

Results. 320 patients were included in the study (EMP n = 185; no-EMP n = 135). Empiric antibiotic selection was more likely to be guideline-concordant when an EMP was present (78% vs. 61%; P = 0.003). Guideline-concordant empiric prescribing occurred more often when an EMP was present in the subgroup of CAP patients (95% vs. 79%; P = 0.005) as well as in the subgroup of CA-IAI patients (62% vs. 44%; P = 0.025). Overall guideline-concordant prescribing significantly increased between the new ASP and established ASP (65% vs. 32.5%; P = 0.001) and was more likely when an EMP was present (new ASP: 68.3% vs. 45.8%, P = 0.005; established ASP: 90.5% vs. 73.7%, P = 0.005). Patients receiving guideline-concordant antibiotics in the ED were continued on appropriate therapy on admission 82.5% of the time vs. 18.8% if the ED antibiotic was inappropriate (P < 0.001). The presence of an EMP did not impact hospital acquired CDI (1.1% vs. 1.5%, P = 1.0) or in-hospital mortality (4.3% vs. 1.5%, P = 0.2).

Conclusion. The presence of an EMP significantly improved guideline-concordant empiric antibiotic prescribing for CAP and CA-IAI. This impact was demonstrated in both a new and established ASP. Inpatient orders were more likely to be guideline-concordant if appropriate therapy was ordered in the ED.

Disclosures. All authors: No reported disclosures.

1586. Is More Always Better? Effect of a Combination *Pseudomonas* Antibiotic on Levofloxacin Use and Patient Outcomes for Pneumonia in a Large Community Hospital

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Background. Evidence suggests that combination therapy for *Pseudomonas* pneumonia only provides mortality benefit in critically ill patients. In November 2015, the Antimicrobial Stewardship Subcommittee at Baptist Memorial Hospital-Memphis (BMH-Memphis) developed a combination *Pseudomonas* antibiotic and guideline, based on local susceptibilities, for critically ill patients with Hospital Acquired Pneumonia (HAP), Health Care Associated Pneumonia (HCAP), or Ventilator Associated Pneumonia (VAP).

Methods. This is a single center, retrospective study evaluating patients admitted to the BMH-Memphis medical intensive care unit (MICU) and surgical intensive care unit (SICU) with a diagnosis of pneumonia (DPG) criteria for HAP, HCAP, or VAP. The primary outcome of this study was to compare levofloxacin days of therapy per 1000 patient-days (DOT/1000 patient-days) before and after implementation of the combination *Pseudomonas* antibiotic guideline at BMH-Memphis. Secondary objectives included a comparison of individual levofloxacin orders, 30-day mortality, hospital