was 13.5 d (range 5–61). One patient died from causes unrelated to infection; all other patients achieved clinical cure and TOL/TAZ was well tolerated. One patient experienced a slight increase in liver function tests that required dose reduction. 3 children received multiple courses (range: 2–8) for CF exacerbations. TOL/TAZ-resistant PA was detected in 1 patient after 2 months of therapy for OM. TOL/TAZ intermediate susceptible PA was detected in 1 patient after 7 courses of therapy for CF exacerbation, though subsequent cultures grew TOL/TAZ susceptible PA.

Conclusion. TOL/TAZ was effective in treating various CR-PA infections. Therapy was well tolerated with no significant adverse events. Reduced TOL/TAZ susceptibility after prolonged or repeated courses was observed and presents potential opportunities for dose optimization and antimicrobial stewardship.

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2424. Review of Antimicrobial Susceptibility Profile of Different Nocardia Species, a Tertiary Center Experience
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Background. Nocardia spp. are ubiquitous Gram-positive weakly acid-fast environmental microorganisms. Although considered an opportunistic infection, approximately 1/3 of the reported infections are in immunocompetent patients. Treatment is usually challenging, prolonged and involves multiple agents depending on the site of infection, clinical syndrome and the immune status of the patient.

Methods. We conducted a retrospective review of clinical cultures with positive results for Nocardia spp. from 2011 to 2017. Specimens were cultured in MGIT broth or on Middlebrook agar plates and isolated colony growth was then identified using MALDI-TOF MS or 16S rDNA gene sequencing. Antimicrobial susceptibility testing was performed using the TREK Sensitive Rapid Growing Mycobacteria Plate.

Results. We reviewed total of 1,840 samples positive for Nocardia spp. Most commonly isolated species included N. cyriacigeorgica (16.9%), N. nova complex (15.7%), N. farcinica complex (14.8%), N. brasiliensis (11.5%) and N. abscessus complex (8.2%). Susceptibilities of the most common Nocardia species are shown in the graph. Source of the positive cultures was variable with majority (>60%) from pulmonary source (sputum, BAL and lung tissue), blood in 5.7% and brain in 3.6%. Most common Nocardia species isolated from brain specimens were N. farcinica complex followed by N. abscessus complex (17/59). Most common Nocardia species isolated from blood were N. farcinica complex (38/99) followed by N. nova complex (22/99) and N. cyriacigeorgica (15/99).

Conclusion. The antimicrobials that continue to show high activity against most Nocardia species (>95%) are: amikacin, linezolid and TMP/SMX. N. pseudobrasiliensis was noted to have high rates of resistance to TMP/SMX (87%). N. farcinia, N. brasiliensis and N. transvalensis/wallaci complex were >90% susceptible to amoxicillin/clavulanic acid. Clarithromycin had >90% activity against N. nova complex while both ceftriaxone and doxycycline had >90% activity against N. abscessus complex. It is crucial to identify Nocardia species and obtain susceptibilities to help better choose the regimen with the best clinical outcome.

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2425. Clinical and Microbiologic Outcomes Among Patients With Monomicrobial Stenotrophomonas maltophilia Infections
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Background. Stenotrophomonas maltophilia is an opportunistic pathogen observed in nosocomial infections. Due to biofilm production and intrinsic resistance to numerous antimicrobials, organism eradication is difficult and morbidity and mortality remain high. Unfortunately, study outcomes are often confounded by co-infecting organisms. Therefore, clinical and microbiologic outcome data for monomicrobial infections is warranted.

Methods. Single-center, retrospective chart review of adult patients receiving treatment for S. maltophilia between January 2012 and October 2016. Polymicrobial infections and cystic fibrosis patients were excluded. Primary endpoint was clinical cure (CC) at end of therapy. Secondary endpoints included microbiological eradication (ME), 28-day mortality, and resistance selection. An exploratory analysis was performed in patients receiving trimethoprim-sulfamethoxazole (TMP/SMX) or levofloxacin (LVX).

Results. Seventy-six patients were included in the analysis. The population was 60 years of age, predominantly female (62%) with median APACHE score of 16. Infection onset occurred 6 days after admission with 71% located in the ICU. Approximately 2/3 of ICU patients were intubated. Primary site of infection was the lung (92%). Treatment strategies included TMP/SMX (45 patients) or LVX (31 patients). Overall, CC, ME, and 28-day mortality was observed in 79%, 82%, and 14%, respectively. Adverse events were uncommon with three patients receiving TMP/SMX requiring pre-discharge therapy. Comparative analysis revealed similar baseline characteristics except higher APACHE scores (18 vs. 14; P = 0.03) and frequency of mechanical ventilation in the TMP/SMX group (64% vs. 30%; P = 0.007). CC was similar between TMP/SMX and LVX (82% vs. 74%, respectively (P = 0.4)). ME was observed in 84% and 77%, respectively (P = 0.5). Resistance selection to primary treatment was observed in 29% (2/7) and 86% (6/7), respectively (P = 0.1).

Conclusion. Use of TMP/SMX or LVX for S. maltophilia infections resulted in high CC rates. No differences in primary or secondary outcomes were observed; however, a trend toward resistance selection with LVX was identified. Larger studies assessing outcomes and resistance selection are warranted to further delineate treatment.

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2426. Ceftaroline-Associated Neutropenia: Retrospective Study and Systematic Review of Incidence, Risk Factors, and Outcomes
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Background. Ceftaroline-associated neutropenia has been reported, but clinical data are limited.

Methods. We performed a retrospective study of ceftaroline-associated neutropenia within a large healthcare system and a comprehensive systematic review of the English literature (2010–2017) of published cases containing individualized case data to describe the incidence, risk factors, and outcomes associated with ceftaroline-associated neutropenia. Neutropenia was defined as an absolute neutrophil count (ANC) of <1,500 cells/mm3. Cases with pre-existing neutropenia or other potential reason for the development neutropenia while on ceftaroline were excluded.

Results. A total of 37 cases of ceftaroline-associated neutropenia have been published. The median patient age was 44 years (range 20–90), 22 (59%) were female, and most were receiving ceftaroline for invasive Staphylococcus aureus infections. The median time from ceftaroline initiation to development of neutropenia was at 25 days (range 8–125 days). Agranulocytosis (ANC nadir <100 cells/mm3) developed in 49% of cases (n = 18) and an ANC nadir of 0 in 27% (n = 10). The median duration of neutropenia was an average of 4 days (range 1–16 days). Eleven (30%) received granulocyte colony stimulating factor (G-CSF) treatment and ceftaroline was discontinued in all cases. The outcome was favorable in all cases, and only one case developed a secondary infection during neutropenia. Literature review of studies containing cases and controls (patients receiving drug but did not develop neutropenia) found an incidence of neutropenia of 12% (range 7–18% per individual study) when ceftaroline was utilized for ≥14 days, higher than for comparator antibiotics in the literature. Risk factors for the development of neutropenia during ceftaroline varied between studies and remains undefined.

Conclusion. Neutropenia is common when ceftaroline is utilized for ≥14 days and routine hematologic monitoring is warranted. Further research is needed to determine the mechanism and risk factors for the high incidence of neutropenia associated with long-term ceftaroline use.

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2427. Comparison of Ceftazidime–Avibactam and Cefotaxime–Tazobactam In Vitro Activities When Tested Against Gram-Negative Bacteria Isolated From Patients Hospitalized With Pneumonia in US Medical Centers (2017) 
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Background. We evaluated Enterobacteriaceae (ENT) and P. aeruginosa (PSA) antimicrobial susceptibility patterns isolated from patients with pneumonia, including ventilator-associated pneumonia (VAP), and compared the in vitro activity of ceftazidime–avibactam (CAZ-AVI) and cefotaxime–tazobactam (C-T) against various-resistant (R) subsets.

Methods. Clinical isolates consecutively collected (1/patient) from 70 US medical centers in 2017 by the INFORM Program were susceptibility (S) tested against CAZ-AVI, C-T, and comparators at a central laboratory by reference broth microdilution methods. The organism collection included 1,865 ENT and 1,337 PSA isolates.

Results. The most active agents against ENT were CAZ-AVI (99.95%; table), amikacin (AMK; 98.76%), the carbapenems meropenem (MEM) and doripenem (97.36%), and tigecycline (TGC; 94.16%), but only CAZ-AVI and TGC retained good activity (≥90%) against carbapenem-resistant ENT (CRE; 98.6% and 90.6%, respectively). The most active agents against multidrug-R (MDR) ENT were CAZ-AVI (99.6%) and AMK (90.6%), whereas C-T and MEM were active against only 55.2% and 77.7% of these organisms, respectively. CAZ-AVI was the most active agent tested against extensively drug-resistant ENT (XDR ENT; 99.6%) followed by AMK (97.32%), TGC (95.60%), and XDR (97.49% and 90.48%) isolates (table). Among PSA isolates NS to CAZ, MEM and piperacillin–tazobactam (P-T), 76% to CAZ-AVI, C-T, and AMK were 73.7%, 76.6% and 82.6%, respectively. All PSA isolates were colistin-S. Among isolates from VAP, S to CAZ-AVI and C-T were 100.0% and 99.2% for ENT (n = 266), and 97.8% and 99.5% for PSA (n = 183), respectively.

Conclusion. CAZ-AVI and C-T showed similar coverage (≥95%) against PSA (96.2–96.5%), including against MDR (84.9–84.6%) and XDR (79.4–80.4%) isolates in contrast, it was less active than CAZ-AVI against ENT in general and exhibited limited activity against ENT-R subsets.

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2428. Lower Rates of Antibiotic Treatment of Vancomycin-Resistant Compared With Vancomycin Susceptible Enterococcal Bacteriuria

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Background. Bloodstream infections cause significant morbidity and mortality in children admitted to intensive care units (ICUs). Enterobacter cloacae bloodstream infections have been particularly difficult to treat given increasing antibiotic resistance and presence of inducible β-lactamases on some strains. The objective of this study was to describe the epidemiology and clinical outcomes for critically ill children with E. cloacae bloodstream infections.

Methods. We performed a retrospective cohort study of children ≤19 years hospitalized in the critical care unit at the Children’s National Medical Center in Washington, DC with E. cloacae bloodstream infections between 2007 and 2016. We excluded polymicrobial infections. We performed chart review to collect baseline characteristics, treatment regimens, and outcomes. Recurrence of infection was defined as new E. cloacae bacteremia within 30 days of discontinuing antibiotics for initial infection.

Results. Twenty-six episodes of E. cloacae bacteremia met inclusion criteria. Median age was 7 months (IQR 2–16 months), and 62/23% patients were African-American. All patients had at least one underlying chronic medical condition, the most common being neuromuscular (35%), end-stage renal disease (27%), oncologic (12%), and short bowel syndrome (15%). Central venous catheter was present in 18 (75%) patients and 10 (38%) had hemodynamic instability requiring vasopressor support at time of bacteremia. Seven isolates (27%) were not susceptible to third-generation cephalosporins. Antibiotic resistance patterns varied, with 7 (27%) receiving carbapenems empirically within 72 hours. Mean duration of bacteremia was 2.9 days. Infection recurred within 30 days in 2 patients (8%) and 2 patients (8%) died within 30 days of the initial positive blood culture.

Conclusion. All episodes of E. cloacae bacteremia occurring in children admitted to the ICU occurred in patients with underlying comorbid conditions, and more than half of affected children were infants <1 year. More than one-third of these infections were associated with severe sepsis and nearly one in ten infected patients died within one month.

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2430. Impact of USCAST Proposed Breakpoint Changes to Aminoglycosides, Cyclines, and Levofloxacin on Carbapenem-Resistant Enterobacteriaceae at a US Tertiary Referral Academic Medical Center

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Background. USCAST is one of many national committees that establish standards for testing and interpreting antimicrobial susceptibility. While working closely with EUCAST, USCAST has proposed updated breakpoints for the aminoglycosides, fluoroquinolones, and tigecycline and is discussing updated breakpoints for the tetacycline antimicrobials. A majority of US hospitals currently utilize FDA or CLSI break points. This study sought to determine the impact of the proposed updated breakpoints on a population of carbapenem-resistant Enterobacteriaceae at a US tertiary referral academic medical center.

Methods. Carbapenem-resistant Enterobacteriaceae (n = 122) from January 2012 to January 2017 were identified as part of routine patient care for study inclusion. Amikacin, gentamicin, tobramycin, levofloxacin, minocycline and tigecycline were evaluated in duplicate on at least two separate occasions by broth microdilution according to CLSI guidelines. The most conservative minocycline breakpoint (≥31 μg/mL) being discussed by USCAST was utilized for analysis. McNemar’s test determined significant susceptibility changes between USCAST and FDA/CLSI breakpoints for all CRE and for K. pneumoniae and Enterobacter spp.