the two groups were similar. Inpatient mortality was found to be significantly higher in ENT patients than NO ENT patients (21.5% vs. 29.4%. P = 0.009). In the multivariable analysis, risk factors found to be independently associated with mortality included enterococcal bacteremia (OR 3.95, 95% CI 1.61–9.73), MELD score (OR 1.11, 95% CI 1.06–1.19), and APEACHE II score (OR 1.14, 95% CI 1.06–1.23).

Conclusion. Enterococcal bacteremia, MELD score, and APEACHE II score were found to be independent risk factors for all-cause inpatient mortality in patients with liver cirrhosis. Future studies are needed to elucidate how treatment choice and bacterial characteristics might also influence patient outcomes.

Disclosures. All authors: No reported disclosures.

124. Impact of Levofloxacin MIC on Outcomes with Levofloxacin Step-down Therapy in Enterobacteriaceae Bloodstream Infections
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Background. The Clinical and Laboratory Standards Institute reduced the levofloxacin minimum inhibitory concentration (MIC) breakpoint from ≤2 to ≤0.5 mg/L for Enterobacteriaceae in 2019 guidelines. The reduction is based on Monte Carlo simulations for a levofloxacin dose of 750 mg daily. The aim of this study was to determine whether there was a difference in clinical outcomes in the treatment of Enterobacteriaceae infections with levofloxacin in step-down therapy, retrospectively comparing patients with isolates with low levofloxacin MICs (≤0.5 mg/L) to high MICs (1–2 mg/L).

Methods. This retrospective, two-center cohort study included patients 21 years of age and older with a monomicrobial Enterobacteriaceae bacteremia with a levofloxacin MIC ≤2 mg/L from March 2017 through December 2018. Patients had to have received treatment with ≥23 days of levofloxacin step-down therapy, initial intravenous therapy with an agent active against the isolated organism, and total duration not exceeding 16 days from first negative blood culture. A subset of patients whose isolates had low levofloxacin MICs were randomly selected for comparison to all patients with high levofloxacin MICs in a 1:3 ratio. The primary outcome was a composite endpoint of recurrence and mortality within 30 days of completion of the antibiotic course. Secondary outcomes included post-treatment length of stay (LOS) and 30-day readmission rate.

Results. Thirty-three patients with high MIC and 99 with low MIC were included. Urinary source was predominant and occurred in 44% of patients, and Escherichia coli was the infecting organism in 48%. Over 80% of patients experienced source resolution or control. The composite endpoint occurred in 8.1% of the low MIC group and 9.1% of the high MIC group (P = 0.856). Median LOS was 4.9 days (IQR 3.7–8.0) in the low MIC group and 4.3 days (IQR 3.2–6.8) in the high MIC group (P = 0.384), and readmission rate was 17.2% in the low MIC group and 15.2% in the high MIC group (P = 0.787).

Conclusion. There was no between-group difference in the primary outcome of recurrence and mortality, with a low overall event rate and short LOS post-culture. These results suggest that levofloxacin effectiveness may be sustained in patients with MICs of 1 or 2 despite levofloxacin not meeting susceptibility criteria by new definitions.

Disclosures. All authors: No reported disclosures.

125. The Clinical Impact of 16S rRNA Bacterial Sequencing in Infective Endocarditis
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Background. Cases of possible and/or culture-negative endocarditis continue to be a diagnostic challenge. Performing bacterial 16S ribosomal RNA polymerase chain reaction (rDNA PCR) sequencing on cardiac valves now allows providers to make microbiologic diagnoses that were previously unobtainable (sensitivity 66–80.5%). However, few publications address how the PCR results impact clinical management in endocarditis patients.

Methods. Between July 1, 2014 and December 31, 2018, the results of all 16S rDNA PCR tests collected from cardiac valves at the University of Michigan were reviewed. Samples were sent to the University of Washington for sequencing. Each chart was then reviewed by two independent ID physicians to determine whether patients’ medical plans were impact by the PCR results.

Results. Forty-one patients were identified with associated 16S rDNA PCR testing from cardiac valves at the University of Michigan. 16 cases met Duke Criteria for definite endocarditis. 22 for possible and 3 were rejected endocarditis. Overall, 18 (43.9%) samples were positive. Of these, 10 patients had concordant positive blood cultures. In 8 patients a previously unsuspected organism was identified. Twenty-four out of 41 patients were considered to have culture-negative endocarditis with October 24 (41.7%) who had positive PCR results.

Twenty-two patients were noted to have operative findings consistent with infection with 16 (72.7%) having corresponding positive PCR results. 4/11 (9.8%) patients had their management plans changed based solely on the PCR findings. In 23/41 (56.1%) cases the PCR result was never referenced by any medical provider in the electronic medical record. There were 7 (17.1%) cases where patients received 6 weeks of antibiotics despite presenting with possible culture-negative endocarditis, noninfectious operative findings and negative valve PCRs which were not reviewed.

Conclusion. 16S rRNA PCR sequencing is a useful tool for obtaining a microbiologic diagnosis in cases of possible or culture-negative endocarditis. The test has significant potential to impact individual patient care and in a subset of cases may be used to escalate antibiotic therapy. However, testing delays and cumbersome resulting methods impede bacterial sequencing from reaching its full potential as a diagnostic modality.

Table 1. 16S rDNA PCR results among patients with definite, possible and rejected endocarditis by Modified Duke Criteria.

| Definite Endocarditis | Possible Endocarditis | Rejected Endocarditis |
|-----------------------|-----------------------|-----------------------|
| Culture Negative (%)  | 18.8                  | 81.8                  | 100                    |
| Positive Valve PCR (%)| 43.8                  | 45.5                  | 9.5                    |
| PCR Reviewed (%)      | 31.3                  | 54.5                  | 33.3                   |
| Management Change     | 6.3                   | 9.1                   | 33.3                   |
| Positive Valve Culture%| 6.3                   | 18.2                  | 0                      |
| Infection Or Findings%| 62.5                  | 22.7                  | 33.3                   |

Disclosures. All authors: No reported disclosures.

126. Cascade of Care for Opioid Use Disorder in Patients with Infective Endocarditis
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Background. The term “Cascade of Care” has been used to analyze care delivered by a health system for conditions such as HIV, hepatitis C, tuberculosis, and diabetes. It outlines sequential steps required to reach a specific outcome (i.e., viral suppression in the case of HIV). This allows to estimate the proportion of patients achieving each step and to identify points in care. Medication-assisted treatment (MAT) is integral in the treatment of patients with infective endocarditis (IE) and opioid use disorder (OUD). We propose a Cascade of Care aiming to identify fundamental milestones in the management of these patients.

Methods. A retrospective cohort study examined patients with IE in the setting of OUD hospitalized between July 1, 2007 and January 1, 2015 to the Cleveland Clinic. We identified 4 key steps along the treatment cascade of these patients and estimated the proportion of patients: (1) evaluated by an addiction treatment service, (2) prescribed MAT while in-patient, (3) prescribed MAT at discharge, and (4) continued MAT at least 90 days after discharge.

Results. Of 273 patients with IE in the setting of OUD, 134 (49%) were evaluated by an addiction treatment service; 45 (17%) were prescribed MAT while in-patient; only 22 (8%) were prescribed MAT at discharge. At 90 days following discharge, there was evidence of continuing MAT for all 22 patients (8%).

Conclusion. Describing the process of addiction treatment for patients with IE and OUD in the format of a cascade of care provides a powerful quantitative method to identify gaps in care and can be used as a resource to implement interventions to address losses. We found only 8% of these patients continued MAT in the community after discharge. This study provides an estimate of how compromised the potential benefits from medical and surgical treatment for IE are by the lack of an effective approach to OUD after hospital discharge.

Figure 1. Cascade of Care for Opioid Use Disorder in Patients with Infective Endocarditis.

Disclosures. All authors: No reported disclosures.

127. Novel Treatment Approach for Left Ventricular Assist Device-related Infections
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128. Adequacy of Commonly Prescribed Antimicrobials for Empiric Coverage of Gram-Negative Bacterial Pathogens Recovered from the Bloodstream of Patients Attending Emergency Rooms in Canada: Analysis of Data from the CANWARD Study, 2007 to 2018

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Background. Inadequate empiric antimicrobial therapy for Gram-negative bacterial infection is associated with adverse clinical outcomes. The purpose of this study was to evaluate the proportion of Gram-negative bacterial isolates recovered from the bloodstream of patients attending Canadian emergency rooms (ERs) that remain susceptible to commonly prescribed antimicrobials.

Methods. Annually from 2007 to 2018, sentinel hospitals across Canada collected bloodstream isolates from patients attending ERs as part of the CANWARD study. Susceptibility testing was performed using broth microdilution as described by CLSI (data analysis limited to Gram-negative bacteria in the top 10 pathogens), with current CLSI breakpoints applied. Extended-spectrum β-lactamase (ESBL)-producing isolates were confirmed using the CLSI disk diffusion method.

Results. Gram-negative bacteria among the top 10 bloodstream pathogens for patients seen at ERs across Canada were: Escherichia coli (n = 2,414), Klebsiella pneumoniae (n = 573), Pseudomonas aeruginosa (n = 211), Proteus mirabilis (n = 119), and Enterobacter cloacae (n = 114). Aggregate susceptibility of these isolates to common antimicrobials was as follows (% susceptible): meropenem 99.4% S, piperacillin–tazobactam 98.5% S, gentamicin 93.3% S, ceftazidime 88.1% S, ciprofloxacin 84.1% S, TMP-SMX 73.5% S. The most active antimicrobials evaluated vs. E. coli were meropenem (100.0% S), piperacillin–tazobactam (98.8% S), and ceftazidime (93.3% S). Ceftazidime susceptibility among E. coli isolates declined from 95.4% in 2007 to 89.8% in 2018. The average proportion of E. coli isolates that harbored an ESBL enzyme increased from 3.4% in the first three study years to 8.4% in the last three study years. The most active antimicrobials evaluated vs. K. pneumoniae isolates were meropenem (99.7% S), piperacillin–tazobactam (98.8% S), gentamicin (97.7% S), and ceftazidime (96.9% S).

Conclusion. The most consistently active antimicrobials for empiric treatment of patients at Canadian ERs with Gram-negative bacteria are meropenem and piperacillin–tazobactam. Ceftazidime susceptibility among E. coli has declined over the last 12 years, mostly related to an increase in ESBL-producing isolates.

Disclosures. All authors: No reported disclosures.

129. Antimicrobial Activity of Ceftazidime–avibactam and Comparator Agents Tested against Gram-Negative Organisms Isolated from Patients with Bacteremia Stream Infections in United States Medical Centers (2017–2018)

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Background. We evaluated the antimicrobial susceptibility of Enterobacteriales (ENT) and P. aeruginosa (PSA) causing bloodstream infections (BSI) in the United States (US) hospitals.

Methods. A total of 3,317 ENT and 331 PSA isolates were consecutively collected (1/patient) from patients with BSI in 68 US medical centers in 2017–2018 and tested for susceptibility (S) by reference broth microdilution methods in a central laboratory as part of the International Network for Optimal Resistance Monitoring (INFORM) Program, β-Lactamase screening was performed by whole-genome sequencing on ENT with decreased S to broad-spectrum cephalosporins (ESBL phenotypet).

Results. The most common ENT species isolated from BSI were E. coli (EC; 41.9% of ENT), K. pneumoniae (KPN; 21.0%), and E. cloacae (ECL; 8.7%). The most active agents against ENT were ceftazidime–avibactam (CAZ-AVI; 99.9%), amikacin (AMK; 99.6%) and meropenem (MEM; 99.3%). CAZ-AVI was active against >90% of multidrug-resistant (MDR) ENT. Among 19 carbapenem-resistant ENT (CRE; 0.6% of ENT), 9 produced a KPC-like, 2 an NDM-1, and 2 an OXA-23. Carbapenemase genes were not found in 6 CRE isolates. COL (100.0%), CAZ-AVI (98.5%), AMK (98.5%), T-C (98.1%), and tobramycin (97.0%) were very active against PSA.

Disclosures. All authors: No reported disclosures.