outcomes (death, cost) using parametric and nonparametric tests when appropriate. A *P*-value < 0.05 was considered significant.

***Results.*** A total of 69 persons met criteria (Table 1). The average length of stay was 30.8 days. Thirty-four (52%) had documentation of antibiotic completion (in or outpatient). Seventeen received surgery: 16 with valve replacement and one device removal. Overall, 14 (20%) died over the study period. There was no significant association between antibiotic completion or 9-item risk and death. When stratified into low risk (<4 items) vs. high risk (≥5), there was no difference in overall direct costs, LOS, or whether patients received surgery.

***Conclusion.*** PWID with IE at a hospital serving a rural, Southern population have a greater length of stay, discharges against advice, surgical interventions, and costs than other regions, relative to existing literature. The lack of association between 9-item risk and outcomes suggests that death and high costs are attributable to factors beyond substance use. Costs of providing care for this population are exorbitant and likely devastating for rural county hospitals within the context of the current public health and payment framework, including Medicaid non-expansion.

**Table 1. Demographics and Hospital Outcomes for PWID with IE (n=69) receiving care at the University of Alabama at Birmingham (UAB)**

| | |
|---|---|
| Age | |
| • Mean (SD) | • 35.9 (9.2) |
| • Median (IQR) | • 35 (11) |
| Male, N (%) | 31 (45) |
| Race | N (%) |
| • White | • 64 (93) |
| • Black | • 3 (6) |
| • Asian | • 1 (1) |
| Insurance | N (%) |
| • Public | • 21 (30.4) |
| • Private | • 9 (13.0) |
| • Uninsured | • 39 (56.5) |
| Surgery | 17 (24.6%) |
| Left AMA | 12 (17.6%) |
| LOS | |
| • Mean (SD) | • 30.88 days (21.1) |
| • Median (IQR) | • 29 (33) range: 4-103 |
| Readmission | 13 (18.8%) |
| Death | 14 (20.3%) |
| Treatment completed | 34 (52%) |
| IVAT score | |
| • Mean (SD) | • 4.97 (1.70) |
| • Median (IQR) | • 5 (2) |
| Initial hospitalization cost data | |
| Total charges | |
| • Mean (SD) | • $235,614.70 (238,113.66) |
| • Median (IQR) | • $142,489.53 (232,295) |
| Direct Costs | |
| • Mean (SD) | • $45,280.18 (76,621.44) |
| • Median (IQR) | • $22,421 (40,819.82) |

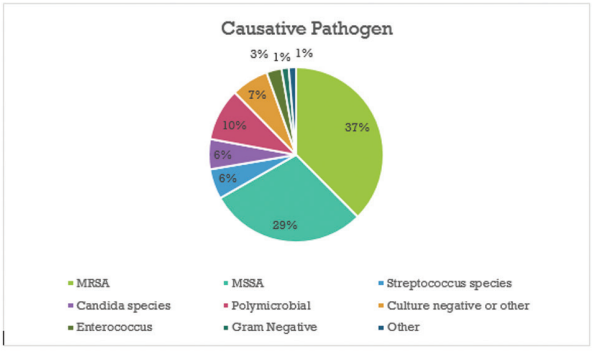


Figure 1. Frequency of infection by causal pathogen, as defined by growth on blood or heart valve culture

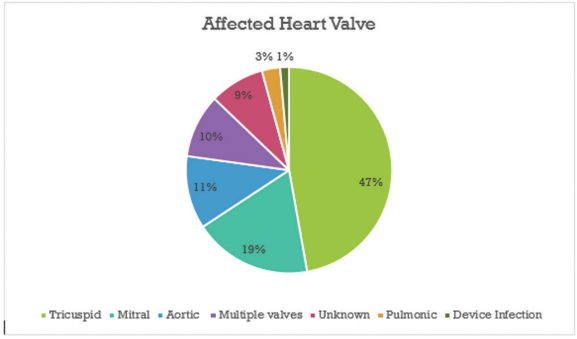


Figure 2. Comparison of infected valve, in PWID with IE at UAB

**Table 2. Intravenous Antibiotics and Addiction Team (IVAT) 9-Point Risk Assessment** (Eaton et al. *Clinical Infectious Diseases.* 2018)

| Risk Factor | Score (0-1) |
|---|---|
| 1. Cravings | |
| 2. Unstable home environment | |
| 3. Dual Psychiatric diagnosis | |
| 4. History of drug overdose | |
| 5. History of multiple relapses | |
| 6. Polysubstance abuse | |
| 7. Family history of addiction | |
| 8. History of Trauma | |
| 9. Limited willingness to change | |
| **Total Score =** | |

One point is given for each of the above risk factors
Low risk is defined as a total score of 4 or less
High risk is defined as score of 5 or greater

***Disclosures.*** **All authors:** No reported disclosures.

## 140. Trends of Infective Endocarditis at a Northern New England Academic Medical Center, From 2011 to 2017: A Case for Improved Methods to Reliably Identify Associated Substance Use

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***Background.*** Infective endocarditis (IE) is a morbid and often lethal complication of injection drug use. There is an urgent need for accurate surveillance for IE related to substance use (SU) to support control strategies.

***Methods.*** We conducted a retrospective comparative analysis of 3 datasets evaluating patients aged ≥16 years admitted to an academic medical center in New England with an ICD-9/10 discharge diagnosis of IE from April 2011 to December 2017. The 3 datasets included the hospital's electronic medical record (EMR); the hospital's Outpatient Parenteral Antibiotic Therapy (OPAT) program dataset; and the New Hampshire Uniform Hospital Discharge Data Set (UHDDS). We analyzed the number of admissions for IE per year, stratified by SU. We developed a SU composite measure by incorporating multiple sources of data from the EMR, and then verified accuracy of both the SU and IE diagnoses through manual chart review.

***Results.*** The EMR documented 472 hospital admissions for IE, representing 385 unique patients. The median age was 56 years and 59% were men. Admissions increased 67%, from 56 in 2012 to 84 in 2017. SU was coded as a discharge diagnosis in 27% of these admissions; however, based on our composite measure of SU, 45% IE admissions were possibly associated with SU. The proportion of IE patients who had evidence of SU increased from 20% in 2011 to 49% in 2017 ($P = 0.002$). Patients with SU compared with those without were younger (40.5 vs. 65.2 years, $P < 0.001$) and more likely to be on Medicaid (59% vs. 8%, $P < 0.001$). They had higher average charges ($146,633 vs. $107,223, $P = 0.002$) and lengths of stay (19.1 vs. 13.4 days, $P < 0.001$). The UHDDS and EMR datasets identified a similar numbers of patients with a diagnosis of IE; however, manual chart review revealed that IE was over-coded in ~one-fifth of admissions.

***Conclusion.*** The rate of IE in our hospital increased dramatically between 2011 and 2017, with a rising proportion associated with SU. Despite these trends, we found that discharge diagnosis coding alone substantially underestimated associated SU and overestimated IE disease burden. Our findings suggest public health administrative datasets, such as the UHDDS, can contribute to surveillance of IE disease burden with consideration of these important limitations, especially for assessing disease trends.

***Disclosures.*** **All authors:** No reported disclosures.

## 141. Use of Rapid Diagnostic Testing in Gram-negative Bloodstream Infections with and without Antimicrobial Stewardship

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***Background.*** Verigene Blood Culture Gram-Negative (VBC-GN) is a rapid diagnostic test (RDT) that can detect key GNs and resistance within hours from

Gram-stain. Numerous studies have shown that RDTs in BSIs improve clinical outcomes, particularly with active antimicrobial stewardship (AMS) intervention. Little is known regarding outcomes in GN BSI without vs. with AMS intervention.

***Methods.*** A retrospective three-part quasi-experimental study of adult patients with GN BSI from December 2014 to April 2018. VBC-GN was introduced September 2015 and AMS review was implemented October 2017. Antibiotics were appropriate if active in vitro against isolated GN. Optimal antibiotics were not overly broad, accounted for resistance, source of infection, and other infecting organisms. Comparisons were made using Chi-squared for nominal variables and Kaplan–Meier with log-rank for time to event analysis.

***Results.*** In total, 772 patients met inclusion. The most common source was urinary (30.1%) and E. coli was the most common GN (37.9%). Infectious Disease consults increased with each group (50.6% vs. 67.9% vs. 81.8%, $P < 0.001$). More patients pre-RDT (37.36%) and RDT+AMS (35.6%) compared with RDT only (24.6%) were critically ill, $P = 0.001$. Optimal therapy was achieved in more patients in RDT-only (79%) and RDT+AMS (86%) groups compared with pre-RDT (66%), $P < 0.001$. More patients in the pre-RDT group (44.7%) were appropriately de-escalated compared with RDT only (31.6%) and RDT + AMS (38.7%), $P = 0.026$. Appropriate escalation occurred most often in the RDT-only group (39.3%) vs. pre-RDT (15.2%) and RDT + AMS (14.2%), $P = 0.019$. Median post-BSI length of stay (8.2 vs. 7.1 vs. 8.5 days, $P = 0.226$) and inpatient mortality (10.8% vs. 14.3% vs. 11.4%, $P = 0.493$) were similar.

***Conclusion.*** With the implementation of VBC-GN RDT there was a significantly decreased time to optimal therapy, mainly based on necessary antibiotic escalation. Antibiotic de-escalation remained a challenge, even with active AMS review.

| Median (IQR) Time (Hours) To: | Pre-RDT (N = 238) | RDT only (N = 309) | RDT + AMS (N = 225) | *P*-value |
|---|---|---|---|---|
| Optimal Antibiotics | 46.6 (35.9 – 58.1) | 24.8 (22.3 – 27.4) | 25.8 (23.7 – 30.1) | 0.220 |
| Antibiotic De-escalation | 62 (54 – 69.9) | 65.5 (53.1 – 77.9) | 67.4 (61.9 - 72.5) | 0.913 |
| Antibiotic Escalation | 48.4 (7.1 – 89.8) | 19.9 (16.4 – 23.5) | 20.9 (17.5 – 24.5) | 0.006 |

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### 142. Mean Platelet Volume Is Associated with Embolic Events of Infectious Endocarditis

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**Session:** 37. Bacteremia, CLABSI, and Endovascular Infections
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***Background.*** Increased mean platelet volume (MPV) is a marker of more active and rapidly aggregating platelets. There is limited evidence that increased MPV is associated with more embolic disease in infectious endocarditis (IE). This study seeks to validate this relationship and assess for effect modification by injection drug use.

***Methods.*** Records of all patients aged ≥18 admitted to Wake Forest Baptist Medical Center (WFBMC) from January 1, 2004 to September 30, 2015 with an ICD-9 code for IE and without a simultaneous ICD-9 code indicating"mechanical complication of cardiac device, implant and graft' were reviewed. Inclusion criteria consisted of possible or definite IE by modified Duke criteria and labs drawn within 24 hours of presentation. Univariate analyses were assessed by Chi-square, Fisher's exact test, Mann–Whitney *U*, and Student's *t*-test. Multiple logistic regression assessed the association between MPV and embolic phenomena while controlling for potential confounders.

***Results.*** A total of 237 cases (80 IDU-IE and 157 non-IDU IE) met criteria for analysis suffering 115 (48.5%) embolic events to the brain and/or lungs (41.4% in non-IDU vs. 62.5% in IDU-IE, $P = 0.002$). MPV ($P < 0.0001$) and drug use ($P = 0.002$) were significantly associated with embolic disease. S aureus involvement ($P = 0.0002$), vegetation ≥1 cm ($P = 0.009$), atrial fibrillation ($P = 0.05$), hypertension ($P = 0.05$), age ($P = 0.0008$), presenting hospital location ($P = 0.001$), total platelets ($P < 0.0001$), age-unadjusted Charleson comorbidity score ($P = 0.001$), and left-sided valve vegetation ($P = 0.006$) were also significantly associated while gender, white blood cell count, creatinine and albumin were not. MPV remained significantly associated with embolic disease in the fully adjusted model with OR 1.4, 95% CI [1.1–1.7]. Vegetation ≥1 cm (OR 2.4, 95% CI [1.2–4.7]), left-sided valve vegetation (OR 0.4, 95% CI [0.2–0.8]) and direct presentation rather than transfer to WFBMC (OR 0.4, 95% CI [0.2–0.8]) also remained significant. There was no evidence of an interaction between MPV and drug use nor evidence of effect modification when the analysis was stratified by drug use status.

***Conclusion.*** Increased MPV is significantly associated with embolic disease of IE even when additional covariates are taken into consideration.

***Disclosures.*** **All authors:** No reported disclosures.

### 143. Opioid Use and Hospitalizations for Endocarditis, Osteomyelitis, and Central Nervous System Abscess among Adults — New York City, 2001–2014

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**Session:** 37. Bacteremia, CLABSI, and Endovascular Infections
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***Background.*** Along with a growing opioid epidemic nationwide, opioid users often have an increased risk of severe infectious diseases including endocarditis, osteomyelitis, and central nervous system (CNS) abscess. As the largest city in the United States, New York City (NYC) may serve as a study model for opioid use and infectious diseases. We investigated the association between opioid use and hospitalizations for endocarditis, osteomyelitis, and CNS abscess in NYC.

***Methods.*** Data for NYC residents aged ≥18 years discharged from New York State hospitals during 2001–2014 were analyzed using a hospital discharge dataset. We defined a hospitalization for endocarditis, osteomyelitis, and CNS abscess as one with a principal or secondary diagnosis for these conditions within the discharge record. We identified opioid users by examining principal or secondary diagnoses for opioid use within the discharge record at the time of hospitalization for endocarditis, osteomyelitis, and CNS abscess. Log-binomial model was applied among all hospitalized patients using endocarditis, osteomyelitis, and CNS abscess as the outcome, adjusting for age, sex, race, and borough.

***Results.*** During 2001–2014, there were 139,392 hospitalizations in total for endocarditis, osteomyelitis, or CNS abscess, of which 8,823 (6.3%) were among opioid users. There was an increased risk of hospitalization for endocarditis [RR: 2.6 (95% CI: 2.5–2.7)], osteomyelitis [RR: 1.1 (95% CI: 1.1–1.1)], and CNS abscesses [RR: 1.9 (95% CI: 1.8–2.1)] among hospitalized opioid users compared with hospitalized nonopioid users, adjusted by age, sex, race, and borough. Hospitalized opioid users had four times the risk for endocarditis hospitalization compared with hospitalized nonopioid users in the 18–44 year age group (RR: 4.2 [95% CI: 3.9–4.5]) (Table 1).

***Conclusion.*** These results provide further evidence that opioid use is associated with an increased risk of endocarditis, osteomyelitis, and CNS abscess. Efforts to combat the opioid epidemic might lower the overall incidence of endocarditis, osteomyelitis, and CNS abscess.

**Table 1. Log-binomial Regression Analysis Stratified by Age Groups to Evaluate the Association between Opioid Use and Hospitalizations for Endocarditis, Osteomyelitis, and Central Nervous System Abscesses among Adults — New York City, 2001–2014**

| Age Group (yr)* | Risk Ratio (95% CI) | | |
|---|---|---|---|
| | Endocarditis | Osteomyelitis | CNS Abscess |
| Overall (≥18) | 2.6 (2.5–2.7) | 1.1 (1.1–1.1) | 1.9 (1.8–2.1) |
| 18–44 | 4.2 (3.9–4.5) | 0.8 (0.7–0.8) | 1.5 (1.3–1.8) |
| 45–64 | 1.9 (1.8–2.0) | 1.2 (1.1–1.2) | 2.0 (1.8–2.3) |
| 65–84 | 0.8 (0.6–1.1) | 1.2 (1.1–1.3) | 2.0 (1.3–3.2) |
| ≥85 | 1.7 (0.4–6.8) | 0.8 (0.2–2.4) | results not reliable |

CNS: Central Nervous System; CI: Confidence Interval
*Overall rates are corrected by age, sex, race, and borough, whereas age group-specific rates are corrected by sex, race, and borough

***Disclosures.*** **All authors:** No reported disclosures.

### 144. Organism Identification and Antibiotic Susceptibilities with Verigene Blood Culture Assay: a Retrospective Single-Center Study

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**Session:** 37. Bacteremia, CLABSI, and Endovascular Infections
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***Background.*** The Verigene blood culture assay is a rapid molecular testing platform for positive blood cultures. Verigene detects a limited number of bacteria and a limited number of antibiotic resistance determinants. While certain Verigene results have clear implications for optimal antibiotic therapy prior to complete antibiotic susceptibility testing, others do not. The purpose of this study was to compare the results of the Verigene blood culture assay with standard organism identification and antibiotic susceptibility testing.

***Methods.*** This was a retrospective cohort study conducted at a single academic medical center. The study period was 14 months from November 2017 to December 2018. All Verigene results from the study period were reviewed and compared with the results of standard organism identification and susceptibility testing. Organism identification and antibiotic susceptibility testing were performed by Vitek MS and Vitek 2. Duplicate results from the same patient were excluded. The primary outcome was the percentage of blood cultures correctly identified by Verigene. Secondary outcomes included the antibiotic susceptibility of organisms identified by Verigene in the presence and absence of resistance determinants and the identity and frequency of organisms not detected by Verigene.

***Results.*** A total of 782 Verigene results were screened. After exclusions, 675 Verigene results including 737 organisms from 597 patients were included. Of 737 organisms, Verigene correctly identified 611 (82.9%), incorrectly identified 19 (2.6%) and was unable to identify 107 (14.5%) off-panel organisms. Tables 1 and 2 outline the antibiotic susceptibility of organisms by the presence or absence of resistance determinants in Gram-negative and Gram-positive bacteria, respectively. Table 3 describes the identities of the organisms not detected by Verigene, stratified by Gram stain result.

***Conclusion.*** The Verigene blood culture assay demonstrated accuracy in identifying organisms and predicting antibiotic susceptibility. These results will help inform the prospective interpretation of Verigene results and subsequent antibiotic selection at the study institution.

**Antibiotic Susceptibility by Organism and Resistance Determinants: Gram Negative Organisms**

| Organism | Resistance | *n* | CRO | MEM | AVI | FEP | TZP | SAM | ESBL |
|---|---|---|---|---|---|---|---|---|---|
| E. coli | CTX-M | 28 | 0% | 100% | - | - | - | - | 100% |
| | None | 79 | 100% | - | - | - | - | - | 0% |
| K. pneumoniae | KPC | 1 | - | 0% | 100% | - | - | - | 0% |
| | CTX-M only | 2 | 0% | 50% | - | - | - | - | 100% |
| | None | 38 | 100% | - | - | - | - | - | 0% |
| Enterobacter spp | KPC | 1 | - | 0% | - | 0% | - | - | - |
| | None | 16 | - | - | - | 94% | - | - | - |
| P. aeruginosa | KPC | 1 | - | 0% | - | 0% | 0% | - | - |
| | None | 13 | - | - | - | 100% | 100% | - | - |
| Proteus spp | CTX-M | 4 | 0% | 100% | - | - | - | - | - |
| | None | 8 | 100% | - | - | - | - | - | - |
| Acinetobacter spp | OXA | 2 | - | 0% | - | - | - | 100% | - |
| | None | 2 | - | - | - | - | - | 100% | - |
| Citrobacter spp | None | 3 | 100% | - | - | - | - | - | - |
| K. oxytoca | None | 2 | 100% | - | - | - | - | - | 0% |

CRO, ceftriaxone; MEM, meropenem; AVI, ceftazidime/avibactam; FEP, cefepime; TZP, piperacillin/tazobactam; SAM, ampicillin/sulbactam; ESBL, ESBL test by Vitek (reported as percent positive); -, susceptibility testing results not available