day of and after discharge were noted. Duration of therapy (DOT) was calculated by the difference between start and stop dates of appropriate antibiotics. Discharge delays due to OPAT-related reasons were recorded. Continuous data are expressed as median (IQR). Categorical data are expressed as frequencies (%).

Results. Of the patients screened, 77 of 123 patients met inclusion criteria. Most patients were treated for a bone/joint infection (29/77, 38%). Ceftriaxone (18/82, 22%) and vancomycin (13/82, 16%) were the most frequently prescribed agents. The median DOT was 30 days (IQR 15, 42). On day of discharge, 52 opportunities for a pharmacist initiated intervention were identified with majority being clarifying DOT (19/52, 37%), streamlining or escalating antibiotic (8/52, 15%), and optimizing drug dose (8/52, 15%). OPAT-related discharge delays resulted in an excess of 58 hospital days and over 25% of patients (20/77) were readmitted 30 days after discharge. The most common post-discharge issues (n=56) were worsening infection (11/56, 20%), PICC line issues (9/56, 16%), and drug related adverse events (8/56, 14%).

Conclusion. A pharmacist on a dedicated OPAT service can assist with antimicrobial selection, treatment duration, and drug monitoring to promote patient safety in patients discharged on antimicrobials.

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

621. Identifying Quality-Improvement Interventions to Improve Inpatient Intravenous Vancomycin Safety at an Academic Medical Center

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Session: P-27. Clinical Practice Issues

Background. The reported incidence of intravenous (IV) vancomycin-associated acute kidney injury (AKI) is highly variable. The primary purpose of this study was to determine the baseline rate of IV vancomycin-associated AKI at the University of Utah Hospital (UUH) and Huntsman Cancer Institute (HCI) with the goal of identifying areas of focus for future quality improvement (QI) initiatives.

Methods. This was a retrospective descriptive study of patients ≥ 18 years old, hospitalized at UUH or HCI, who received at least daily scheduled doses of IV vancomycin for ≥ 72 hours between November 1, 2018 and October 31, 2019. AKI was defined using the serum creatinine (SCr) aspect of the AKIN criteria. Variables assessed for association with AKI included demographic characteristics, hospital and unit where vancomycin was initiated, duration of therapy, administration method, and concomitant nephrotoxic medications. Multivariable logistic regression was used to identify variables independently associated with AKI as potential QI interventions.

Results. One thousand eighty-six patients were included. Baseline patient characteristics are listed in Table 1. Throughout our system, 19.7% of patients experienced an AKI while receiving vancomycin. Univariate comparisons are listed in Table 1. Variables independently associated with AKI on multivariable analysis included total body weight (HR 1.02, 95% CI [1.01-1.03]), concomitant administration of calcineurin inhibitors or vasopressors (HR 1.97, 95% CI [1.18-3.29] and HR 1.68, 85% CI [1.07-2.64] respectively), duration of vancomycin therapy (HR, 1.04, 95% CI [1.02-1.06]), and administration in specific units (see Table 1). Administration of vancomycin by continuous infusion showed a protective effect (HR 0.13, 95% CI [0.02-1.12]) as did baseline SCr and total daily dose of vancomycin (HR 0.76, 95% CI [0.61-0.94] and HR 0.63, 95% CI [0.51-0.78] respectively); the latter two are likely a reflection of the study design. The median hospital length of stay in days was longer in individuals experiencing an AKI (19 vs 10, p < 0.0001).

Table 1. Univariate and Multivariate Associations with Vancomycin-Associated Acute Kidney Injury

Variable	Total (n = 1086)	AKI (n = 215)	No AKI (n = 871)	Unadjusted		Adjusted[a]	
				HR (95% CI)	*P*-value	HR (95% CI)	*P*-value
Age, years, median (IQR)	58 (44-67)	60 (48-70)	57 (43-66)	1.01 (1.00-1.02)	**0.004**		
Sex, male, n (%)	653 (60)	145 (67)	508 (58)	1.48 (1.08-2.03)	**0.01**		
Race, n (%)					0.33		
White	889 (82)	171 (80)	718 (82)	1.00			
Other	82 (8)	13 (6)	69 (8)	0.79 (0.43-1.46)	0.46		
American Indian or Alaska Native	36 (3)	13 (6)	23 (3)	2.37 (1.18-4.78)	**0.02**		
Unknown	26 (2)	6 (3)	20 (2)	1.26 (0.50-3.18)	0.63		
Asian	20 (2)	4 (2)	16 (2)	1.05 (0.35-3.18)	0.93		
Black or African American	19 (2)	5 (2)	14 (2)	1.50 (0.53-4.22)	0.44		
Native Hawaiian or Other Pacific Islander	14 (1)	3 (1)	11 (1)	1.15 (0.32-4.15)	0.84		
Weight, kg, median (IQR)	82 (68-100)	90 (75-110)	79 (66-98)	1.02 (1.01-1.02)	**<0.0001**	**1.02 (1.01-1.03)**	**<0.0001**
Body mass index, kg/m², median (IQR)	28 (23-33)	30 (25-36)	27 (23-32)	1.03 (1.01-1.04)	**<0.0001**		
Estimated creatinine clearance, mL/min, mean (SD)	98 (64-138)	102 (65)	108 (56)	0.998 (0.995-1.000)	0.21		
Hospital							
University Hospital	875 (81)	173 (81)	702 (81)	1.00			
Huntsman Cancer Institute	211 (19)	42 (20)	169 (19)	1.01 (0.69-1.47)	0.97		
Intensive care unit, n (%)	400 (37)	112 (52)	288 (33)	2.20 (1.63-2.98)	**<0.0001**		
Hospital length of stay, days, median (IQR)	12 (6-22)	19 (11-32)	10 (6-19)	1.02 (1.01-1.03)	**<0.0001**		
Continuous infusion vancomycin, n (%)	34 (3)	1 (0)	33(4)	0.12 (0.02-0.87)	**0.01**	**0.13 (0.02-1.12)**	**0.06**
Total duration of vancomycin therapy, days, median (IQR)	6 (4-10)	9 (5-18)	5 (4-9)	1.05 (1.03-1.06)	**<0.0001**	**1.04 (1.02-1.06)**	**<0.0001**
Baseline serum creatinine, mg/dL, median (IQR)	0.9 (0.7-1.3)	1.1 (0.8-1.8)	0.9 (0.7-1.2)	1.31 (1.13-1.53)	**<0.0001**	**0.76 (0.61-0.94)**	**0.009**
Total daily vancomycin dose, mg, median (IQR)	2250 (1500-3000)	1750 (1250-2500)	2500 (1500-3000)	0.62 (0.53-0.74)	**<0.0001**	**0.63 (0.51-0.78)**	**<0.0001**
Concomitant medication							
Piperacillin-tazobactam	547 (50)	128 (60)	419 (48)	1.59 (1.17-2.15)	**0.003**		
Contrast media	511 (47)	111 (52)	400 (46)	1.26 (0.93-1.69)	0.13		
Vasopressor	222 (20)	84 (39)	138 (16)	3.41 (2.45-4.73)	**<0.0001**	**1.68 (1.07-2.64)**	**0.03**
Calcineurin inhibitor	113 (10)	39 (18)	74 (9)	2.39 (1.57-3.64)	**<0.0001**	**1.97 (1.18-3.29)**	**0.01**
Aminoglycoside	36 (3)	10 (5)	26 (3)	1.59 (0.75-3.34)	0.22		

[a]For continuous variables, the HR reported is for each unit increase

Table 1. (Continued) Univariate and Multivariate Associations with Vancomycin-Associated Acute Kidney Injury

Variable	Total (n = 1086)	AKI (n = 215)	No AKI (n = 871)	Unadjusted		Adjusted[a]	
				HR (95% CI)	*P*-value	HR (95% CI)	*P*-value
Concomitant medication (Continued)							
Amphotericin b	13 (1)	7 (3)	6 (1)	4.85 (1.61-14.59)	**0.002**		
Polymixin	5 (0)	0 (0)	5 (1)	-	0.59		
Foscarnet	3 (0)	2 (1)	1 (0)	8.17 (0.73-90.51)	0.10		
Hospital unit, n (%)							
Medicine 1	103 (9)	13 (6)	90 (10)	1.00			
Medicine 2	88 (8)	14 (7)	74 (8)	1.31 (0.58-2.96)	0.52		
Medicine 3	30 (3)	2 (1)	28 (3)	0.49 (0.11-2.33)	0.37		
Surgical 1	91 (8)	18 (8)	73 (8)	1.71 (0.78-3.71)	0.18		
Surgical 2	89 (8)	9 (4)	80 (9)	0.78 (0.32-1.92)	0.59		
Cardiology	36 (3)	12 (6)	24 (3)	3.46 (1.40-8.55)	**0.007**	**2.94 (1.13-7.70)**	**0.03**
Neurology	31 (3)	0 (0)	31 (4)	-	0.99		
Bone marrow transplant	73 (7)	18 (8)	55 (6)	2.27 (1.03-4.98)	**0.04**		
Hematology	55 (5)	5 (2)	50 (6)	0.69 (0.23-2.05)	0.51		
Surgical oncology	33 (3)	2 (1)	31 (4)	0.45 (0.10-2.09)	0.31		
Hematology/oncology ICU	48 (4)	17 (8)	31 (4)	3.80 (1.68-8.70)	**0.002**	**2.78 (1.12-6.89)**	**0.03**
Medical ICU	75 (7)	16 (7)	59 (7)	1.88 (0.84-4.19)	0.12		
Neurological ICU	99 (9)	9 (4)	90 (10)	0.69 (0.28-1.70)	0.42		
Burn trauma ICU	37 (3)	6 (3)	31 (4)	1.34 (0.47-3.83)	0.47		
Cardiovascular ICU	73 (7)	36 (17)	37 (4)	6.74 (3.21-14.13)	**<0.0001**	**2.89 (1.21-6.91)**	**0.02**
Surgical ICU	69 (6)	28 (13)	41 (5)	4.73 (2.22-10.05)	**<0.0001**	**2.84 (1.25-6.43)**	**0.01**
Other units with less than 30 vancomycin administrations	56 (5)	10 (5)	46 (5)	1.51 (0.61-3.69)	0.37		

[a]For continuous variables, the HR reported is for each unit increase

Conclusion. Several variables associated with vancomycin-associated AKI within our health system were identified. Future QI interventions to improve vancomycin safety will be pursued.

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622. Evaluation of Vascular Access Device Selection in Patients Discharged on Outpatient Parenteral Antimicrobial Therapy

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Session: P-27. Clinical Practice Issues

Background. Selection of a vascular access device (VAD) is an important consideration for patients receiving outpatient parenteral antimicrobial therapy (OPAT). Midline catheters (MC) and peripherally inserted central catheters (PICC) are the most commonly placed VADs, with the former recommended by national guidelines to be used for durations no longer than two weeks. These recommendations, however, are based on limited data from heterogeneous populations. As such, we aim to further characterize VAD-associated complications specifically in patients receiving antimicrobials.

Methods. We conducted a retrospective cohort study that included adult patients discharged on OPAT with a newly inserted MC or PICC between January 2020 and August 2020. Patients with non-OPAT VAD indications were excluded. The primary outcome was the incidence of VAD-associated complications, which was further assessed by type and severity. The secondary outcome was time to complication. Multivariable Poisson regression was used to assess the association between VAD type and incidence of VAD-associated complications.

Results. A total of 190 encounters from 181 patients were included for analysis. Baseline demographics are detailed in Table 1. Despite a higher number of complications in the PICC group, rates per 1000 VAD days were not significantly different between VAD types (Table 2). Median time to first complication was 17 days in the overall cohort. Multivariable regression analysis showed those with a dermatologic history had a four-fold increased risk for VAD-associated complications (Table 3). VAD type was not independently associated with the risk of developing a complication.

Table 1: Patient demographics

	PICC (N=93)	MC (N=88)
Age – years, median (IQR)	60 (49-70)	63 (39-71)
Sex, male – n (%)	57 (61)	56 (64)
BMI – kg/m², median (IQR)	25.9 (23-31)	25.6 (22-30)
Race – n (%)		
Asian	2 (2)	4 (4)
Black/African American	31 (33)	16 (18)
White	57 (61)	65 (74)
Other	1 (1)	1 (1)
Unknown/declined to answer	2 (2)	2 (3)
Ethnicity – n (%)		
Hispanic, Latino	6 (6)	3 (3)
Non-Hispanic, Non-Latino	86 (92)	82 (93)
Unknown/declined to answer	1 (1)	3 (3)
Comorbidities – n (%)		
Hypertension	51 (55)	36 (41)
Diabetes	34 (37)	25 (28)
Obesity	25 (27)	22 (25)
Concomitant anticoagulation	22 (24)	27 (31)
History of venous thromboembolism	13 (14)	15 (17)
Active malignancy	10 (11)	11 (13)
Dermatologic history	5 (5)	2 (2)

Abbreviations: PICC, peripherally inserted central catheter; MC, midline catheter; IQR, interquartile range; BMI, body mass index

Table 2: Rates of VAD-Associated Complications		
	PICC (N=100)	MC (N=90)
Line duration – days, median (IQR)	36.5 (22-40.3)	12 (9-18.5)
Complication – n (%)	23 (23)	8 (9)
Time to first complication – days, median (IQR)	19 (14-30)	6.4 (5-17)
Complication rate per 1000 VAD days (95% CI)	10.6 (7.7-14.6)	8.0 (4.5-14.6)
General complications* – n (%)	15/23 (65)	7/8 (88)
Dermatitis	7/15 (47)	1/7 (14)
Dislodgement	5/15 (33)	2/7 (29)
Erythema	4/15 (27)	1/7 (14)
Leaking	3/15 (20)	2/7 (29)
Edema	3/15 (20)	0 (0)
Bleeding	2/15 (13)	1/7 (14)
Purulence	0 (0)	1/7 (4)
Severe complications* – n (%)	11/23 (48)	3/8 (38)
Occlusion	9/11 (82)	2/3 (67)
Venous thromboembolism	2/11 (18)	0 (0)
Infiltration/extravasation	0 (0)	1/3 (33)
Healthcare interventions* – n (%)	23/23 (100)	8/8 (100)
Dressing change	8/23 (35)	3/8 (38)
TPA administered	10/23 (43)	1/8 (13)
Line reinsertion/reposition	3/23 (13)	0 (0)
VAD removed/replaced	9/23 (39)	6/8 (75)
Escalation to healthcare professional	20/23 (87)	8/8 (100)
ED admission	6/23 (26)	1/8 (13)
Inpatient hospitalization	3/23 (13)	1/8 (13)
Abbreviations: TPA, tissue plasminogen activator; ED, emergency department *Variables were collected throughout the entirety of OPAT duration and were not mutually exclusive		

Table 3: Multivariable Regression Analysis		
	IRR (95% CI)	P value
VAD Type (MC to PICC)	-0.84 (-0.42, 1.65)	0.612
Dermatologic History	4.13 (1.48, 11.52)	0.007
Obesity*	1.64 (-0.90, 2.97)	0.106
Concomitant Anticoagulant Use	-0.49 (0.22, 1.09)	0.080
Abbreviations: IRR, incidence rate ratio; CI, confidence interval *Obesity defined as BMI ≥ 30 kg/m^2		

Conclusion. Our results suggest that the development of VAD-associated complications was strongly associated with patients' dermatologic history. To our knowledge, dermatologic history has not been previously identified as a risk factor for VAD-associated complications. Thorough assessment of patient-specific risk factors can inform optimal VAD selection for patients discharged on OPAT. Further studies are needed to assess the safety of MC for extended OPAT use.

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

623. Exploring 'Slicer Dicer', an Extraction Tool in EPIC, for Clinical and Epidemiological Analysis

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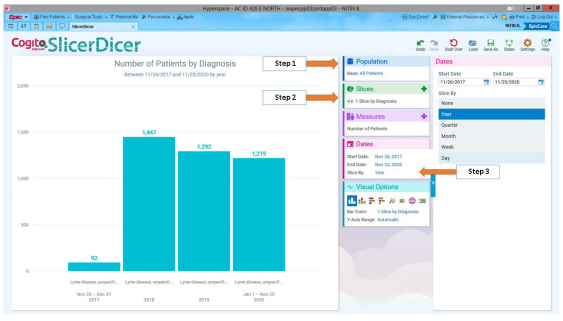
Session: P-27. Clinical Practice Issues

Background. Electronic Health Record (EHR) implementation has created an unprecedented library of patient data. Data extraction tools provide an opportunity to retrieve clinico-epidemiological information on a wide scale. Slicer Dicer is a data exploration tool in the EPIC EHR that allows one to customize searches on large patient populations. This software contains a variety of models that present de-identified information from EPIC's Caboodle database. We explored the applicability and potential utility of this tool utilizing the diagnosis of Lyme disease as an example.

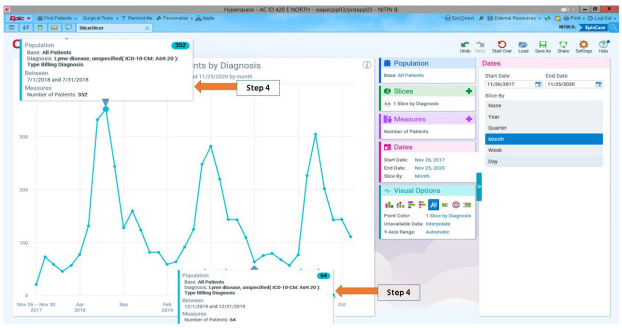
Methods. The following steps outline an overview of data extraction utilizing ICD-10 codes around Lyme disease at our health system. Step 1-3: Denominator chosen as 'All Patients' over a 3-year period, 'Slicing' of the data by 'Lyme disease, unspecified' was applied to these results, and the 'sliced' data was categorized by year of diagnosis (Slide 1). Step 4: This data was further arranged by month of diagnosis for trend analysis (Slide 2). Step 5: Sub-diagnosis was applied for Lyme arthritis (Slide 3). Step 6: Further 'slicing' was/can be done by other variables, such as 'Hospitalization,' 'Encounter Diagnosis,' and 'ED Diagnosis' (Slide 4). Step 7-8: Output was 'sliced' by 'Age' (Slide 5) and 'Postal Code' (Slide 6).

Slide 1. EPIC EHR screen capture showing 3-year period data



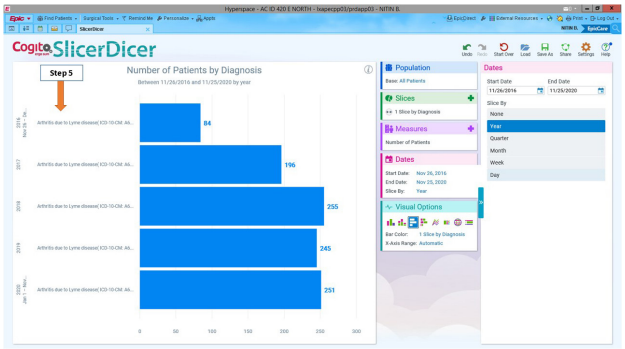
Data shown here represents 'All patients' chosen as the denominator further sliced by 'Lyme disease, unspecified' and categorized by the year of diagnosis.

Slide 2. EPIC EHR screen capture showing data further arranged by month of diagnosis

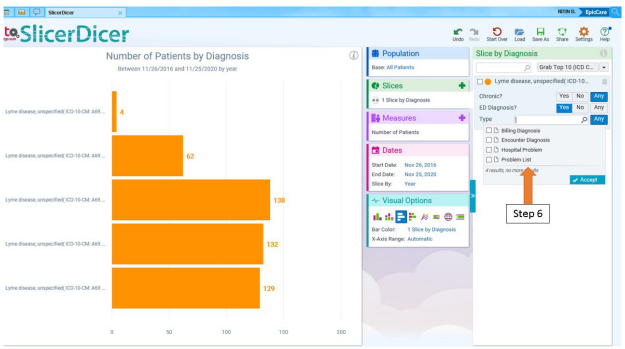


Results. Macro-level data of period prevalence on Lyme disease over 3 years (Slide 1), seasonal trends (Slide 2), specific sub-diagnosis (Slide 3), output by setting of diagnosis (Slide 4), and demographic information of our patient population (Slides 5, 6) was revealed by application of these parameters.

Slide 3. EPIC EHR screen capture showing application of sub-diagnosis for Lyme arthritis



Slide 4. EPIC EHR screen capture showing further slicing by multiple variables like hospitalization and diagnosis



Slide 5. EPIC EHR screen capture showing slicing of data by demographic information (Age)