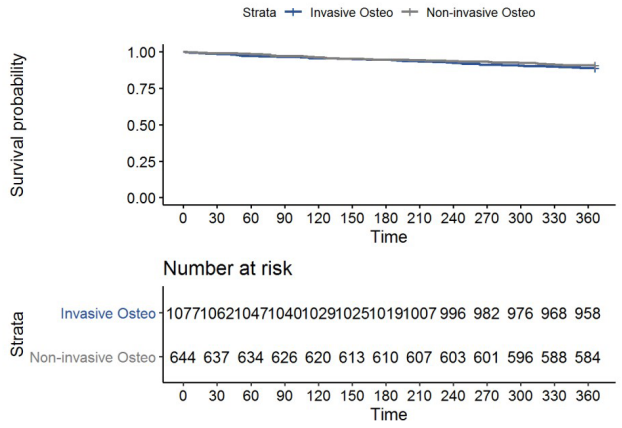
Figure 2: Survival



Conclusion: Over 1/3 of the cases of osteomyelitis caused by GBS do not meet the case definition for invasive disease. Whether diagnosed using invasive or non-invasive microbiological cultures, survival outcomes for people with GBS osteomyelitis were similar. These findings suggest that non-invasive GBS osteomyelitis is as clinically important as invasive GBS osteomyelitis and that the rates of GBS osteomyelitis may be higher than previously reported.

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326. More Specialties, Less Problems: Creating collaborative competency between Infectious Disease, Podiatry, and Pathology co-managing diabetic foot infections

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Session: P-10. Bone and Joint

Background: According to the 2016 and 2017 National Health Interview Survey, 9.7% of the US population is estimated to have diabetes mellitus (either type 1 or type 2). [1] Among patients with diabetes, there is a 15% lifetime risk of developing a foot ulcer, making it an extremely common medical problem seen in both outpatient and inpatient settings.[2] In fact, Medicare spends $9–13 billion/year on diabetic foot osteomyelitis (DFO).[3] Despite this high prevalence and cost, experts have not agreed on a set of diagnostic criteria for diagnosing DFO, [4] nor the optimal antibiotic management.[5] For example, while traditionally diabetic foot osteomyelitis has been treated with 4–6 weeks of IV antibiotics in the United States, oral antibiotics have been shown to be effective with similar cure rates in multiple studies [6–8], non-inferior in a Cochrane review,[5] and are recommended in the most recent (2012) Infectious Disease Society of America (IDSA) DFO clinical practice guidelines.[9]

Methods: Representatives from ID, Podiatry, and Pathology collaborated to develop consensus on aspects of management of DFO. We created an educational session, inviting providers from all three departments to develop consensus on some of the controversial aspects of DFO. We assessed for knowledge gain by having these providers complete a pre-test survey as well as a post-test survey 2 weeks after the intervention.

Level of Training	Number (N=27)	Percentage of Total Participants
Nurse (or Nursing Student)	2	7%
Resident	2	7%
Pharmacist (or Pharmacy Student)	4	15%
Fellow	9	33%
Attending	10	37%
Primary Specialty		
Podiatry	3	11%
Pathology	2	7%
Infectious Disease	22	81%
Diabetic Foot Infection Cases Seen		
Less than 1 per month	5	19%
1 to 5 per month	11	41%
More than 5 per month	11	41%

Table 1: Characteristics of Participants.

Results: 27 providers completed both a pre and post-tests after attending the educational session. Significant improvements were observed in learners understanding of duration of antibiotic treatment and the role of oral antibiotics in certain cases of diabetic foot osteomyelitis to obviate the need for an unnecessary intravenous antibiotics and Peripherally Inserted Central Catheter (PICC) lines. Additionally, by working as an interdisciplinary group, many solvable misunderstandings were identified, and processes were adjusted to improve the quality and efficiency of care provided to these patients.

Figure 1: Results of the Pre- and Post- Assessment

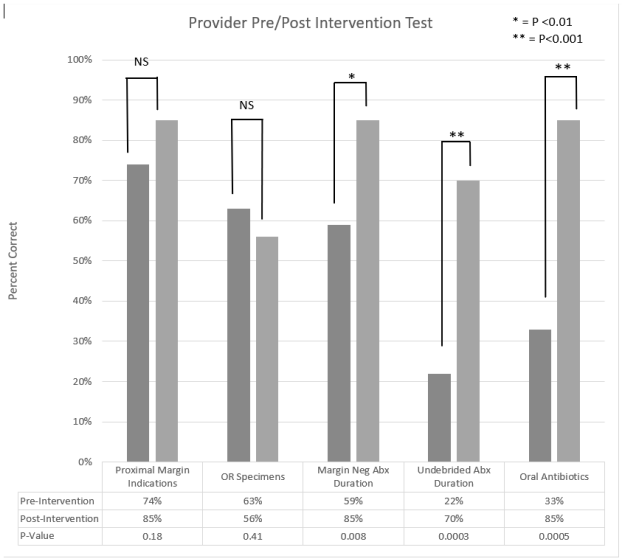

Figure 1: Results from the Pre and Post Surveys of Providers after the Educational Session.

Conclusion: This multidisciplinary, educational session regarding management of DFO led to improved provider knowledge and collaborative competency between these three departments. Further study is being completed assessing patient outcomes before and after this intervention and will be available by IDWeek.

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327. Oritavancin Activity against Staphylococcus aureus Isolates Causing Bone and Joint Infections in European Hospitals (2010–2019)

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Session: P-10. Bone and Joint

Background: Bone and joint infections (BJI) frequently are caused by *Staphylococcus aureus* (SA), and since prolonged therapy courses typically are required, agents with convenient administration are preferred. Oritavancin (ORI) is a long-acting lipoglycopeptide approved as a single dose regimen for treating skin and skin structure infections. This study evaluates the activity of ORI and comparators against SA causing BJI in European (EU) hospitals.

Methods: A total of 575 SA isolates from the SENTRY Antimicrobial Surveillance Program causing BJI in 15 EU countries from 2010 to 2019 were included. Bacterial identification was confirmed by MALDI-TOF MS. Broth microdilution susceptibility (S) testing and interpretation was performed following current CLSI guidelines. The activities of ORI and comparators were evaluated across the years and by EU region: western Europe (W-EU; 491 isolates) and eastern EU/Mediterranean region (E-EU; 84 isolates).

Results: Methicillin resistance (MRSA) was observed in 20.5% of SA (18.5% in W-EU and 32.1% in E-EU), ranging from 31.1% in 2011 to 14.6% in 2016. MRSA rates were slightly lower in 2016–2019 (14.6%-19.2%) than previous years (2011–2013; 24.4%-31.1%). ORI exhibited 100.0% susceptibility across the entire SA collection with yearly MIC_{50} and MIC_{90} variations within 1 doubling dilutions (MIC_{50} and MIC_{90}, 0.015–0.03 and 0.03–0.06 mg/L, respectively), regardless the MRSA phenotype or EU region. Daptomycin, vancomycin, teicoplanin, and linezolid also showed complete coverage against SA. Clindamycin (CLI; >99.0%S) and levofloxacin (> 95.0%S) were active against methicillin-susceptible SA, but less active against MRSA (67.8%S and 16.1%S, respectively). E-EU MRSA isolates displayed lower S rates than W-EU MRSA isolates to ceftaroline (83.3% vs. 90.6%), CLI (44.4% vs. 74.7%) and tetracycline (66.7% vs. 89.0%), respectively.

Conclusion: MRSA rates among isolates causing BJI varied within regions. Although several drugs were *in vitro* active against MSSA, options remained limited against MRSA. ORI showed *in vitro* activity against the entire collection of European SA isolates and may be a consideration for treating BJI with the convenience of drug administration.

Table 1

Antimicrobial agent	All *S. aureus* (n=575)		MRSA W-EU (n=91; 18.5%)		MRSA E-EU (n=27; 32.1%)		MSSA W-EU (n=400; 81.5%)		MSSA E-EU (n=57; 67.9%)	
	%S[a]	%R[a]	%S[a]	%R[a]	%S[a]	%R[a]	%S[a]	%R[a]	%S[a]	%R[a]
Oritavancin	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0
Ceftaroline [b]	98.0	0.0	90.6	0.0	83.3	0.0	100.0	0.0	100.0	0.0
Clindamycin	92.9	7.1	74.7	25.3	44.4	55.6	99.2	0.8	100.0	0.0
Daptomycin	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0
Levofloxacin	80.5	19.2	14.3	83.5	22.2	77.8	96.7	3.3	100.0	0.0
Linezolid	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0
Oxacillin	79.5	20.5	0.0	100.0	0.0	100.0	100.0	0.0	100.0	0.0
Teicoplanin	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0
Tetracycline	93.9	5.4	89.0	7.7	66.7	33.3	97.8	2.0	87.7	12.3
Vancomycin	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0

[a] Criteria as published by CLSI (2020).
[b] Ceftaroline was included as a comparator beginning in 2016.
MRSA, methicillin-resistant *S. aureus*; MSSA, methicillin-susceptible *S. aureus*; W-EU, Western European region; E-EU, Eastern European region

Disclosures: Cecilia G. Carvalhaes, MD, PhD, A. Menarini Industrie Farmaceutiche Riunite S.R.L. (Research Grant or Support)Allergan (Research Grant or Support)Cidara Therapeutics (Research Grant or Support)Cipla Ltd. (Research Grant or Support)Fox Chase Chemical Diversity Center (Research Grant or Support)Melinta Therapeutics, Inc. (Research Grant or Support)Merck (Research Grant or Support) Merck (Research Grant or Support)Merck & Co, Inc. (Research Grant or Support) Pfizer (Research Grant or Support) Jennifer M. Streit, BS, A. Menarini Industrie Farmaceutiche Riunite S.R.L. (Research Grant or Support)A. Menarini Industrie Farmaceutiche Riunite S.R.L. (Research Grant or Support)Allergan (Research Grant or Support)Melinta Therapeutics, Inc. (Research Grant or Support)Melinta Therapeutics, Inc. (Research Grant or Support)Merck (Research Grant or Support)Paratek Pharma, LLC (Research Grant or Support) Helio S. Sader, MD, PhD, A. Menarini Industrie Farmaceutiche Riunite S.R.L. (Research Grant or Support)Allergan (Research Grant or Support)Allergan (Research Grant or Support)Allergan (Research Grant or Support)Cipla Ltd. (Research Grant or Support)Cipla Ltd. (Research Grant or Support)Melinta (Research Grant or Support) Merck (Research Grant or Support)Merck (Research Grant or Support)Paratek Pharma, LLC (Research Grant or Support)Pfizer (Research Grant or Support) Rodrigo E. Mendes, PhD, A. Menarini Industrie Farmaceutiche Riunite S.R.L. (Research Grant or Support)Allergan (Research Grant or Support)Allergan (Research Grant or Support)Basilea Pharmaceutica International, Ltd (Research Grant or Support)Cipla Ltd. (Research Grant or Support)Department of Health and Human Services (Research Grant or Support)GlaxoSmithKline (Research Grant or Support)Melinta Therapeutics, Inc. (Research Grant or Support)Merck (Research Grant or Support)Merck (Research Grant or Support)Pfizer (Research Grant or Support)

328. Outcomes in Spinal Cord Injury Patients with Stage 3 and 4 Pressure Injuries at a Veterans' Affairs Hospital

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Session: P-10. Bone and Joint

Background: Pressure injuries (PI) and the complication of PI-related osteomyelitis (PIrOM), are a significant source of morbidity and mortality in spinal cord injury (SCI) patients. This study describes the epidemiology, healthcare utilization, and outcomes of SCI patients with PI at a large Veterans' Affairs (VA) hospital.

Methods: We retrospectively reviewed all SCI patients with stage 3 or 4 PI in the pelvic area admitted to the VA North Texas SCI unit from 1/1/2013 to 12/31/2018. We abstracted demographic, diagnostic testing, treatment, and outcomes data from PI-related admissions for wound care from the electronic medical record. A composite definition categorizing the diagnosis of PIrOM was created (**table 1**). Two-sample t test and Fisher's exact test were used to compare variables between flap patients (FP, those who received at least one flap surgery) and non-flap patients (NFP, those without any flap surgery).

Table 1. Composite Definition for Pressure Injury-related Osteomyelitis

Category	Criteria
Definite	• Bone sample with positive findings on histology and positive cultures* OR • Operative findings with "soft, discolored, nonbleeding" bone
Probable	• Positive imaging (MRI or SPECT-CT) plus bone sample with positive histology OR • Positive imaging (MRI or SPECT-CT) plus bone sample with positive culture
Possible	One of the following: • Positive imaging (MRI or SPECT-CT) • Bone sample with positive cultures • Bone sample with positive histology • Visible bone on wound care team exam • Consulting infectious diseases team is treating as osteomyelitis
None	Does not meet any of the above criteria

*Definitions
Positive histology: the presence of inflammatory cells (polymorphonuclear cells in acute inflammation or mononuclear cells in chronic inflammation) in bone tissue
Positive microbiology/cultures: one positive bone culture with non-commensal organism, or at least two bone samples with the same commensal organism (coagulase-negative staphylococci, *Micrococcus*, *Corynebacterium*, *Cutibacterium acnes*)

Results: A total of 78 patients, accounting for 113 hospitalizations, and 138 unique PI, were identified (**table 2**). Patients had a mean age of 59 years at index admission and male predominance (97%). Of the 138 PI, 49% were ischial and 88% were stage 4. There were 27 FP and 51 NFP. The mean Charlson Comorbidity Index was 4.9 overall and significantly higher in the NFP vs. FP (5.2 vs. 4.3, p=0.05). Diagnostics included at least one imaging study in 76% (n=86) of hospitalizations and a bone biopsy in 45% (n=51). Bone biopsy cultures were commonly polymicrobial (47%, n=24), with anaerobes, *Staphylococcus aureus*, and *Streptococcus* species being the most predominant organisms. A diagnosis of definite, probable, or possible PIrOM was made in 14%, 16%, and 41% of hospitalizations, respectively (**table 3**). Healthcare utilization was high, with a mean length of antibiotic therapy of 54 days and mean length of stay of 122 days per hospitalization. The rates of healed PI overall at discharge and at 1 year were 27% and 39%, and 12% and 40% in the NFP group. The 1-year mortality for NFP was 22%, while all FP were alive at one year.

Table 2. Demographics and Comorbidities in SCI Patients with Stage 3 and 4 Pressure Injury

	Non-Flap Patients N = 51	Flap Patients N= 27	Total N= 78 (%)	p-value
Age (mean) years	59.5	59.1	59.4 (SD ± 13.54)	
Male Gender	49	27	76 (97.4%)	
Race				
African American	15	6	21 (26.9%)	
Asian	1	0	1 (1.3%)	
Caucasian	29	19	48 (61.5%)	
Native Hawaiian	0	1	1 (1.3%)	
Not reported	6	1	7 (9.0%)	
ASIA Impairment Scale				
A	20	21	41 (52.6%)	
B	5	3	8 (10.3%)	
C	16	3	19 (24.4%)	
D	10	0	10 (12.8%)	
SCI level of injury				
C0-8	24	9	33 (42.3%)	
T1-12	22	16	38 (48.7%)	
L1-5	5	2	7 (9.0%)	
Charlson Comorbidity Index (mean)	5.2	4.3	4.9	**0.050**
Diabetes	15	6	21 (26.9%)	0.597
Cardiac Disease	9	1	10 (12.8%)	0.151
Cerebral Vascular Disease	5	1	6 (7.7%)	0.659
Chronic Kidney Disease	3	2	5 (6.4%)	1.000
Chronic Obstructive Lung Disease	7	1	8 (10.3%)	0.250
Malignancy	6	1	7 (9.0%)	0.411
Liver Disease	5	2	7 (9.0%)	1.000
Connective Tissue Disease	2	1	3 (3.8%)	1.000
Tobacco Use	17	4	21 (26.9%)	0.109
Mental Health Diagnosis	25	10	35 (44.9%)	0.347

Table 3. Healthcare Utilization, Osteomyelitis Classification, and Outcomes in PI-related Hospitalizations

	Non-flap hospitalizations N= 81	Flap hospitalizations N= 32	Total Hospitalizations N = 113 (%)
ID consult	65	26	91 (80.5%)
Imaging performed#	61	25	86 (76.1%)
MRI	37	14	51
SPECT-CT	16	7	23
CT	27	12	39
Plain films	7	2	9
Bone biopsy	26	25	51 (45.1%)
Deep tissue culture	25	27	52 (46%)
Osteomyelitis Diagnosis			
Definite	9	7	16 (14.2%)
Probable	10	8	18 (15.9%)
Possible	33	13	46 (40.7%)
None	29	4	33 (29.2%)
Length of Stay			
Mean number of days	113	144	122 (SD ±95.2)
Median (IQR)	70 (106)	114 (63.75)	105 (102)
Readmissions	9	5	14 (12.4%)
Total Length of Therapy			
Mean number of days	50.2	64.8	54.1 (SD ±42)
Median (IQR)	44 (58)	60 (48.75)	49 (64)
Empiric Antibiotics*			
Mean# of days	18 hospitalizations 53.1	0 hospitalizations	18 hospitalizations 53.1
Antibiotics Prior to Biopsy			
Mean# of days	20 hospitalizations 20	19 hospitalizations 24.6	39 hospitalizations 23.3
Antibiotics After Biopsy			
Mean # of days	28 hospitalizations 64.4	28 hospitalizations 53.3	56 hospitalizations 58.9
Total Healed PI at discharge**	12/101 (11.9%)	25/37 (67.6%)	37/138 (26.8%)
Total Healed PI at 1-year**	40/101 (39.6%)	14/37 (37.8%)	54/138 (39.1%)
Mortality 1-year	Non-flap patients 11/51 (21.6%)	Flap patients 0	Total number of patients 11/78 (14.1%)

Imaging performed: at least one type of imaging was performed during the hospitalization
*Empiric antibiotics: treatment for PIrOM was not directed by bone biopsy or deep tissue culture
**Total number of PI 138 (101 in non-flap hospitalizations, 37 in flap hospitalizations)

Conclusion: Despite significantly high healthcare utilization, VA SCI patients with stage 3 and 4 PI had very poor wound outcomes and high mortality, particularly in NFP. Evidence-based, high value care paradigms are needed for this population and disease state.

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329. Performance of Next Generation Sequencing in Isolating a Pathogen in Pediatric Osteoarticular Infections

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Session: P-10. Bone and Joint

Background: Osteoarticular infections are often encountered in the pediatric population. Therapy is guided by isolation of a putative organism, however, operative cultures are often negative. Next generation sequencing (NGS) allows for more sensitive sampling of body compartments generally considered sterile. We sought to evaluate the utility of NGS in comparison to culture in detecting a pathogenic organism in acute osteomyelitis and septic arthritis in children.

Methods: This was a single-site study to evaluate the utility of NGS in comparison to culture in detecting a pathogenic organism in acute osteomyelitis and septic arthritis in children. Eligible patients were all patients with osteomyelitis or septic arthritis