with positive BSI identified by BioFire FilmArray Blood Culture Identification (BCID) Panel™ or Accelerate PhenoTest Blood Culture kit™2 between January 2018 – July 2019 were evaluated and pertinent data was collected.

Results. Rapid diagnostic technologies identified 108 bloodstream infections due to gram positive, 56 due to gram negative, and 6 due to *Candida* organisms. Mean time to optimal antimicrobial therapy was significantly lower when pharmacist recommendation was accepted versus when primary care team consulted ID for recommendation or did not accept pharmacist recommendation. Mean time to optimal therapy was 14.7, 34.3, and 271.3 hours ($p < 0.0001$) respectively. Median total cost of visit per patient, calculated using the average wholesale price of antibiotics multiplied by the number of doses received, was significantly lower when pharmacist recommendations were accepted ($86.40, $147.95, and $239.41, respectively).

Baseline characteristics

Baseline patient characteristics (N= 170)				
Variable	ASP Pharmacist recommendation accepted (n=90)	ID team consulted (n=38)	ASP Pharmacist recommendation NOT accepted (n=42)	p-value
Gender: Female Male	 45 (50%) 45 (50%)	 13 (34.2%) 25 (65.8%)	 21 (50%) 21 (50%)	0.2280
Age	73 ± 16.1 (median = 75.5)	69.6 ± 15.1 (median = 71)	74.1 ± 15.1 (median = 78)	0.3267
Organism identified Gram Negative Gram Positive Yeast	 29 (32.2%) 56 (62.2%) 5 (5.6%)	 12 (31.6%) 25 (65.8%) 1 (2.6%)	 15 (35.7%) 27 (64.3%) 0 (0%)	0.7105

Microbiological isolates

Microbiological isolates (N= 170)	
Gram Positive Organisms (n=108)	
Methicillin susceptible *Staphylococcus aureus*	48
Methicillin susceptible *Staphylococcus aureus*	**8**
Streptococcus spp.	33
***Enterococcus* spp.**	**15**
Other	4
Gram Negative Organisms (n=56)	
Escherichia coli	37
Klebsiella pneumoniae	**7**
Other	12
Yeast (n=6)	
Candida spp.	6

Primary outcome (N= 170)				
Variable	ASP Pharmacist recommendation accepted (n=90)	ID team consulted (n=38)	ASP Pharmacist recommendation NOT accepted (n=42)	p-value
Time to optimal antimicrobial therapy (hr)	8.1 (3.9, 24.1)	25.7 (17.2, 44.5)	241.2 (118.0, 352.5)	<0.0001

Primary Outcome: Time to Optimal Therapy

Conclusion. The establishment of a pharmacist run antimicrobial stewardship program in conjunction with rapid diagnostic tools for identifying bacteremia led to a decrease in time to optimal antimicrobial therapy and cost savings. Introduction of similar services at community hospitals with limited ASP staffing is justified. Larger studies to further investigate whether ASP partnered with rapid diagnostics have an impact on patient-related outcomes such as mortality and length of stay is warrented.

Secondary outcomes

Secondary outcomes (N= 170)				
Variable	ASP Pharmacist recommendation accepted (n=90)	ID team consulted (n=38)	ASP Pharmacist recommendation NOT accepted (n=42)	p-value
Total cost of visit (USD)	86.4 (51.02, 295.03)	147.95 (87.84, 342.11)	239.41 (158.61, 512.18)	0.0002
Mortality during admission	8 (8.9 %)	3 (7.9%)	5 (11.9 %)	0.8317
30-Day mortality	2 (2.2 %)	0 (0.0%)	3 (7.14 %)	0.1696
30-day unscheduled readmission	15 (16.7 %)	4 (10.5%)	7 (16.7 %)	0.6111
Microbiological clearance at 48 hours: No No follow-up cultures Yes	 12 (13.3 %) 11 (12.2 %) 64 (71.1 %)	 9 (23.7%) 1 (2.6%) 28 (73.7%)	 8 (19.0 %) 6 (14.3 %) 27 (64.3 %)	0.2415
Length of stay	10.0 (6.0, 16.0)	13.5 (7.0, 28.0)	11.0 (6.0, 17.0)	0.0933
Length of stay from time of PharmD notification	8.0 (5.0, 14.0)	10.0 (6.0, 20.0)	9.0 (4.5, 15.0)	0.0753

Missed cost savings

Variable	N	Mean	Median (IQR)	25th Pctl	75th Pctl
Actual cost of visit (USD)	42	892.49	239.41	158.61	512.18
Hypothetical cost of visit had ASP pharmacist recommendation been accepted (USD)	42	648.73	111.80	62.88	235.34
Potential cost savings (USD)	42	263.62	112.32	15.80	323.72

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

644. Phenotypic and Genomic Analysis of Novel, Fastidious, Gram-negative Bacilli Isolated from Clinical Wound Specimens

Benjamin Liu, MD, PhD[1]; Keith Simmon, MS[2]; Mark Fisher, PhD, D(ABMM)[3]; [1]University of Utah School of Medicine/ARUP, Salt Lake City, Utah; [2]ARUP, Salt Lake City, Utah; [3]ARUP Infectious Diseases Laboratory, Salt Lake City, UT

Session: P-29. Diagnostics: Bacteriology/mycobacteriology

Background. Animal bites are considered the thirteenth leading cause of nonfatal ED visits. Epidemiology studies have shown a rise in dog bites during the COVID-19 pandemic in the U.S. In Oct. 2020, we received a facultatively anaerobic, non-hemolytic Gram-negative rod (OL1) from a dog bite wound for identification. 16S rRNA gene sequencing showed OL1 was 95.9% identical to *Ottowia pentelensis* in the family *Comamonadaceae*. Our historical sequence database revealed 8 additional isolates (OL2-OL9) from hand wounds/abscesses (including 3 dog bites) since 2012 that had ⩾ 99.8% identity with OL1. Most other *Ottowia* sp. have been isolated from industrial and food sources, with no reports from patient samples. As these clinical isolates likely represent a novel *Ottowia* species, we aimed to characterize them using both phenotypic and genomic approaches.

Methods. The OL isolates were tested in API 20 NE panels (8 conventional and 12 assimilation tests) for 4 d. Paired-end genomic DNA libraries (Nextera DNA Flex Library Prep, Illumina) were sequenced as 150 nt reads by Illumina NovaSeq. *De novo* assembly, annotation, functional prediction, and phylogenetic analyses were performed with Geneious, PATRIC, and web-prediction databases. Strain comparison was done with StrainTypeMer.

Results. All 9 OL isolates were negative for indole, urea, arginine, esculin, PNPG, glucose fermentation and carbohydrate assimilation tests. Potassium gluconate assimilation and gelatin hydrolysis were positive for 5 and 4 isolates, respectively. StrainTypeMer showed the isolates from different patients were not closely related, but 2 from the same patient were indistinguishable. The estimated genome size was ~3.1 Mbp, with 66.1% G/C, and ~3523 coding genes. Potential virulence factors (BrkB and MviM), multidrug efflux systems (MdtABC-TolC and Bcr/CflA), and 1-2 intact prophages were identified. Genomic phylogenetic analysis with RAxML showed the OL isolates clustered separately from all known *Ottowia* spp.

Conclusion. These OL isolates are fastidious, Gram-negative bacilli from clinical wound specimens, and are associated with dog bites. Genomic and 16S rRNA gene sequence analysis suggests these isolates constitute a novel species within the family *Comamonadaceae*.

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

645. Rapid Diagnosis of Disseminated *Mycobacterium kansasii* infection in Renal Transplant Recipients Using Plasma Microbial Cell Free DNA Next Generation Sequencing

Tosin Ogunsiakan, MD[1]; Kristen D. Fajgenbaum, MD[2]; Gautam Phadke, MD[3]; Thomas Montgomery, M.D.[4]; Kiran Gajurel, MD[5]; [1]Carolinas Medical Center, Atrium Health, Charlotte, NC; [2]Atrium Health - Carolinas Medical Center, Charlotte, NC; [3]Metrolina Nephrology, Charlotte, NC; [4]Atrium Health, Charlotte, NC; [5]Carolinas Medical Center, Charlotte, NC

Session: P-29. Diagnostics: Bacteriology/mycobacteriology

Background. Disseminated *Mycobacterium kansasii* infection is rare in kidney transplant recipients. The diagnosis may not be suspected readily due to non-specific clinical presentation. The diagnosis and treatment can be further delayed due to poor sensitivity of culture (especially of extra-pulmonary sites) and slow growth in culture media. Accurate and rapid diagnosis of disseminated *M. kansasii* infections in transplant recipients is important for antimicrobial management.

Methods. Two cases of disseminated *M. kansasii* infections with unusual presentation in which rapid diagnosis was made using the Karius test (KT) are presented. The KT is a CLIA certified/CAP-accredited next-generation sequencing (NGS) plasma test that detects microbial cell-free DNA (mcfDNA). After mcfDNA is extracted and NGS performed, human reads are removed, and remaining sequences are aligned to a curated database of >1400 organisms. Organisms present above a statistical threshold are reported.

Results. Case 1: A 31-year female kidney transplant recipient presented with a thyroglossal duct cyst, as well as swelling of her right metacarpophalangeal joint and left 3rd finger. AFB culture of the thyroglossal cyst aspiration done on post admission day (PAD) 2 took 27 days to be identified as *M. kansasii* (on PAD 29) whereas plasma sent for KT on PAD 5 reported a positive test for *M. kansasii* at 284 molecules/microliter (MPM) in 4 days (on PAD 9). Case 2: A 59-year male kidney transplant recipient presented with generalized weakness, arthralgia, pericardial effusion, cytopenia, weight loss and intermittent fevers. Plasma sent for KT on PAD 12 was reported positive for *M. kansasii* at 1314 MPM in 3 days (on PAD 15). PET CT done simultaneously was consistent with an infection of an old AV graft in the left upper extremity. The AFB culture of the resected graft was confirmed as *M. kansasii* in 22 days on PAD 36. After the KT was available (before confirmation of *M. kansasii* on culture), the first patient underwent modification of empiric treatment and the second patient was started on specific treatment for *M. kansasii*.

Table of *M. kansasii* cases

Parameter	Case 1	Case 2
Age, Gender	31, Female	59, Male
Underlying comorbidities	SLE, kidney transplant, non-ischemic cardiomyopathy	Insulin dependent diabetes, hypertension, kidney transplant
Immunosuppressive medications	mycophenolate , tacrolimus , prednisone 10 mg daily	mycophenolate, belatecept , prednisone 10 mg daily
Presenting symptoms of infection and duration	Anterior neck swelling/pain, 1st MCP pain/swelling, left 3rd finger swelling, subjective fevers for 8 days	Generalized weakness, fever, generalized arthralgia for 2 months. Found to have significant pericardial effusion
T max/fever at presentation	Afebrile	101 F
WBC with %N	16800/µL (88% neutrophils)	4600 /µL (79% neutrophils)
ESR mm per hr	53 mm/hr	83 mm/hr
AFB blood culture	Not done	Positive
AFB culture result (other than blood)	Thyroglossal cyst aspiration (post admission day 2) AFB stain 4+ AFB culture positive on post admission day 8 Identified as *M. kansasii* on post admission day 29	Site: AV graft and stent resection (post admission day 14): AFB stain 1+ AFB culture positive on post admission day 27 Identified as *M. kansasii* on post admission day 36
Imaging modality and other diagnostics *	CT soft tissue neck: 4.5x 4.6cm multilocular cystic lesion of thyroglossal duct cyst Right hand X-ray: 8 mm lucent lesion in the 1st proximal phalanx Left hand ultrasound: fluid in the 3rd flexor tendon sheath	Left upper extremity ultrasound: subcm fluid along the inferior margin of the AV graft, no deep fluid. PET/CT: hypermetabolic activity in the soft tissue involving the vascular graft
Karius Test result molecule/microliter (MPM)	M kansasii: (284) Teno torque virus 15: (56) Peptoniphilus harei: (109)	M kansasii: (1314) Cytomegalovirus: (225)
Time to result from Karius Test collection	4 days	3 days
Time to result from Karius Test sample receipt	3 days	1 day
Location of infection	Infected thyroglossal duct cyst Possible right MCP septic arthritis and left 3rd finger tenosynovitis	Infected AV graft and stent Mycobacteremia Possible pericarditis and synovitis (knees/wrists)
Empiric antibiotics	Vancomycin x 3 days ; Cefepime x 4 days; Azithromycin x 5 days; Pyrazinamide x 7 days (continued until MTB probe was negative) INH, Rifampin and ethambutol started on post admission day 5	Vancomycin x 8 days Ceftriaxone/cefepime x 11 days (continued for 3 more days after KT) Doxycycline x 4 days
Duration of empiric antibiotics before Karius test result	9 days	8 days
Antimicrobials after Karius Test (and clinical impact)	Azithromycin and pyrazinamide stopped Ethambutol, Isoniazid and Rifampin continued	Ethambutol; Rifabutin; Isoniazid
Karius Test impact on decision to biopsy	Right hand effusion drained	None (AV graft explantation done before diagnosis)
Duration of anti-tubercular drugs	Ongoing	Ongoing
Duration of hospitalization	17 days	42 days (excluding rehab)
Outcome	Improving	Improving

*Other diagnostics:
Case 1: HIV Ag/Ab, CT chest, CXR, right knee and foot Xray, Bacterial blood culture- negative
Case 2: CT chest and abdomen, CXR, X ray hand, MRI of lower extremities, HIV Ag/Ab, serum cryptococcal antigen, urine histoplasma antigen, serum Blastomyces antigen, serum coccidioides antibody, RPP, malaria smear, serum1,3 BDG, serum Parvovirus PCR, bacterila blood culture, pericardial fluid AFB , fungal and bacterial culture: all negative

Rapid diagnosis of disseminated *M. kansasii* infection

Conclusion. Open-ended NGS plasma testing for mcfDNA identified disseminated *M kansasii* infection much earlier than standard microbiology and thus helped in initiation and modification of pathogen directed treatment.

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646. Increasing Use of Interferon-Gamma Release Assay to Test for Pediatric Tuberculosis in a Low-Burden Setting

Jeffrey Campbell, MD[1]; Mingwei Sun, BA[1]; Wei He, MS[2]; Gabriella S. Lamb, MD, MPH[1]; Gabriella S. Lamb, MD, MPH[1]; Mary Tabatneck, MD[1]; Don Goldmann, MD[3]; Vishakha Sabharwal, MD[4]; Thomas Sandora, MD MPH[1]; Jessica Haberer, MD, MS[5]; [1]Boston Children's Hospital, Boston, MA; [2]Massachusetts General Hospital, Boston, MA; [3]Boston Children's Hospital, Harvard Medical School, Washington, DC; [4]MD, Boston, MA; [5]Harvard Medical School, Boston, MA

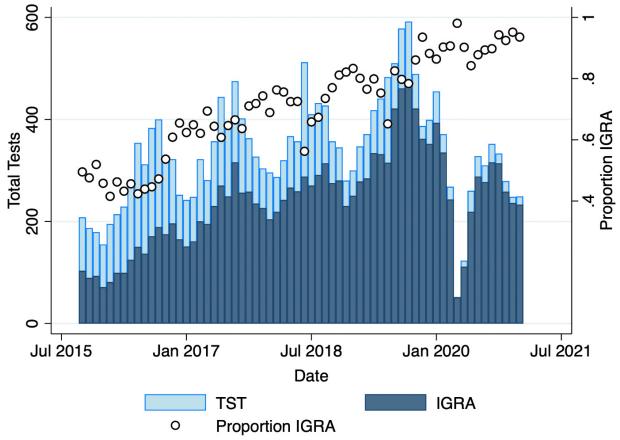
Session: P-29. Diagnostics: Bacteriology/mycobacteriology

Background. The American Academy of Pediatrics recommends tuberculin skin tests (TSTs) or interferon gamma release assays (IGRAs) to test for tuberculosis (TB) infection in children ≥2 years old, and prioritizes IGRA testing in Bacille Calmette-Guérin vaccine recipients due to cross-reactivity. TSTs require a return visit, which frequently results in loss to follow up. Growing evidence supports accuracy of IGRA testing in pediatric patients, including young children, leading to calls for preferential use of IGRA over TST. We sought to evaluate trends in IGRA use in children over time.

Methods. We identified all TB infection tests conducted in children 5-17 years old at 2 academic medical systems in Boston from October 2015–January 2021. TSTs were identified using medication administration records, and IGRAs were identified using laboratory records. We computed the proportion of tests per month that were IGRA and TST. We used Pearson correlation to determine the association between month of testing and proportion of tests that were IGRAs.

Results. 21,471 TB infection tests were obtained from 16,778 patients during our timeframe. Median age of testing was 13.4 years (IQR 9.2 – 16.2 years). During the study period, there was a significant increase in the monthly proportion of TB infection tests that were IGRAs (Pearson correlation coefficient 0.92, $P < 0.001$). The total number of tests performed per month also increased, with seasonal increases in testing in late summer and early fall and a substantial decline in testing early in the COVID-19 pandemic.

Tuberculosis infection tests and proportion IGRA.



Total number of tuberculosis infection tests per month and proportion of tests that were interferon gamma release assays, from October 2015 - January 2021.

Conclusion. Use of IGRAs among patients age 5-17 years of age increased significantly overall and compared to TST in two large Boston healthcare systems over a 5-year period. These results suggest a shift towards blood-based TB infection testing in a low-burden setting, which may improve completion of the pediatric TB infection care cascade. Future research is needed to determine reasons for changing testing modalities, and similar patterns in other settings.

Disclosures. **Gabriella S. Lamb, MD, MPH**, Nothing to disclose

647. Investigation of Heteroresistance Among *Klebsiella pneumoniae* (KP) Inner Colonies (IC) Observed During Fosfomycin Disk Diffusion (DD) Testing

Morgan L. Bixby, BS[1]; Amanda Krueger, n/a[2]; Elizabeth B. Hirsch, PharmD[1]; [1]University of Minnesota College of Pharmacy, Saint Paul, Minnesota; [2]University of Minnesota, College of Pharmacy, Bloomington, Indiana

Session: P-29. Diagnostics: Bacteriology/mycobacteriology

Background. During fosfomycin DD testing, the frequent occurrence of non-susceptible IC within the zone of inhibition of susceptible isolates has been noted. The Clinical & Laboratory Standards Institute (CLSI) and European Committee on Antimicrobial Susceptibility Testing (EUCAST) have contradicting recommendations on how IC should be interpreted; CLSI recommends considering IC when interpreting DD results whereas EUCAST recommends ignoring them. This study sought to identify the susceptibility of these IC and to understand whether heteroresistance contributes to the appearance of IC during fosfomycin DD.

Methods. This study included a convenience sample of 71 KP clinical isolates from 3 United States locations. During DD testing, 58 (81.7%) of these isolates displayed at least one IC. Broth microdilution (BMD) minimal inhibitory concentration (MIC) testing, using extrapolated CLSI *Escherichia coli* breakpoints, was performed on a subset (n=32) of the IC in duplicate for comparison to the corresponding parent MIC values. This was followed by a modified disk elution screening test for heteroresistance to compare the frequency of low level resistance (LLR) and high level resistance (HLR) between the susceptible isolates that produced resistant IC (n=6) and those that did not produce any IC (n=3).

Results. The MIC range for the IC isolates (128 to > 1024 µg/mL) increased as compared to the parent isolates (< 2 to > 256 µg/mL) and $MIC_{50/90}$ increased from the parent (128/ > 256 µg/mL) to IC (1024/ > 1024 µg/mL) isolates. All IC isolates had a resistant MIC value vs. 46.5% of parent isolates, and over 90% of IC isolates had an MIC at least 2 dilutions higher than their corresponding parent isolate. Heteroresistance screening found all tested isolates to be positive for LLR, and 8 of 9 positive for HLR, while the one HLR-negative isolate was IC-producing.

Conclusion. IC were frequent during fosfomycin DD testing and were commonly more resistant than their corresponding KP parent isolates. A small subset of these isolates tested via a modified disk elution test displayed either LLR or HLR regardless of the absence of IC. These results call for further investigation among a larger isolate set to understand what mechanisms are responsible for the frequency of IC and their increased fosfomycin resistance.

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