Biologics, Inc.: Collaborator, Research support;; **J. Papin**, Synthetic Biologics, Inc.: Collaborator, Research support; **S. Connelly**, Synthetic Biologics, Inc.: Employee, Salary; **M. Kaleko**, Synthetic Biologics, Inc.: Employee and Shareholder, Salary and stock options

87. Epidemiology and Trends of Pertussis among Infants: United States, 2000–2015

Catherine Bozio, PhD, MPH[1]; Tami Skoff, MS[1]; Tracy Pondo, MSPH[2]; Jennifer Liang, DVM[1]; [1]Meningitis and Vaccine Preventable Diseases Branch, Centers for Disease Control and Prevention, Atlanta, Georgia; [2]Respiratory Diseases Branch, Centers for Disease Control and Prevention, Atlanta, Georgia

Session: 29. Identification, Treatment, and Prevention of Pediatric Bacterial Pathogens
Thursday, October 5, 2017: 8:30 AM

Background. Pertussis, a cyclic respiratory disease, causes the greatest morbidity and mortality among infants, particularly those too young to be vaccinated. Following a resurgence of pertussis in the 1990s, a recommendation was made in 2012 to vaccinate during every pregnancy in order to prevent infant disease. We describe pertussis trends from 2000–2015 among U.S. infants aged <1 year.

Methods. We analyzed infant pertussis cases reported through the National Notifiable Diseases Surveillance System from 2000 to 2015. Incidence rates (cases per 100,000 population) among various age groups (<2, 2– <4, 4– <6, and 6–<12 months) were calculated using National Center for Health Statistics population estimates as denominators. Negative binomial regression was used to estimate the annual average percent change with a linear trend; $P < 0.05$ was significant.

Results. From 2000 to 2015, 48,909 infant pertussis cases and 255 deaths were reported; infants aged <2 months accounted for 38.7% of cases. The age distribution of infant cases was stable from 2000 to 2009 but changed from 2010 to 2015 (Fig. 1), as the proportion of cases aged 4–<12 months increased annually on average by 4.7% ($P < 0.001$). Annual incidence was highest among <2 month olds; however, rates increased among older infants (Fig. 2): 7% average annual increase among infants aged 4–<6 months and 11% among infants aged 6–<12 months ($P < 0.001$ for each). The proportion of infants hospitalized decreased over time in each age group ($P < 0.001$ for all) with the largest annual average declines among 4–<6 (−5.1%) and 6–<12 month (−5.9%) olds. For all age groups, hospitalization rates were relatively stable, but non-hospitalization rates increased ($P < 0.05$ for all). The case–fatality ratio (CFR) was highest among <2 month olds (1.6%); CFRs decreased over time among <2 and 2–< 4 month olds ($P < 0.05$ for each).

Conclusion. Pertussis incidence remains highest among infants aged <4 months, although the age distribution appears to be changing. Decreasing proportions of infants hospitalized may suggest a true decline in disease severity or an increase in reporting of less severe disease. Ongoing monitoring of infant pertussis is needed to better understand the impact of vaccinating pregnant women to prevent pertussis in young infants.

Figure 1. Age distribution of infant cases, 2000 - 2015

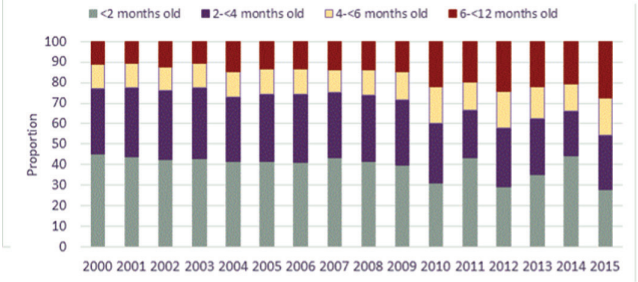
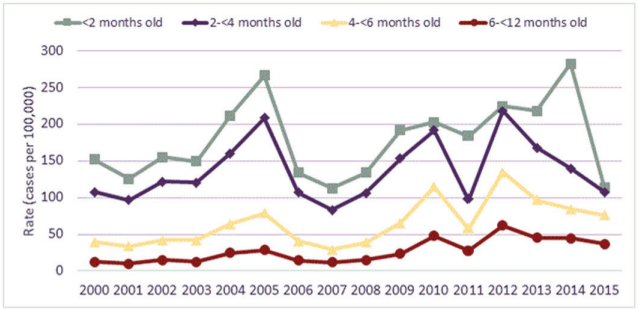


Figure 2. Incidence of pertussis by infant age group, 2000 - 2015



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

88. Risk Factors for Early Hip or Knee Prosthetic Joint Infection (PJI): Analysis of a Nationwide American Insurance Claims Dataset

Aaron Tande, MD[1]; Dennis Asante, MS[2]; Lindsey Sangaralingham, MPH[2]; Douglas Osmon, MD[1]; Herbert Heien, MS[2]; Tad Mabry, MD[3]; Elie F. Berbari, MD, FIDSA[1]; [1]Division of Infectious Diseases, Mayo Clinic, Rochester, Minnesota; [2]Center for the Science of Health Care Delivery, Mayo Clinic, Rochester, Minnesota; [3]Orthopedics, Mayo Clinic, Rochester, Minnesota

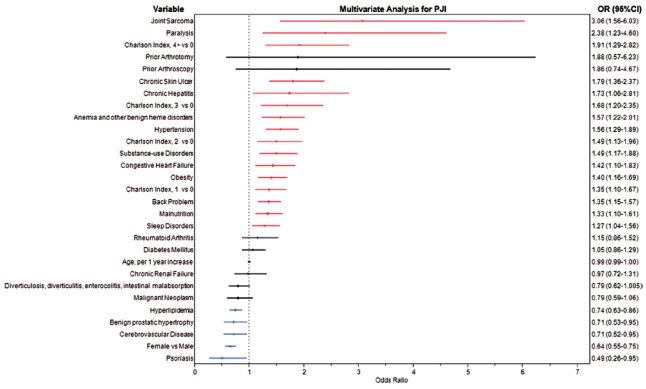
Session: 30. It's not just Bones: Skin and Bones
Thursday, October 5, 2017: 8:30 AM

Background. While several studies have identified risk factors for PJI using insurance claims data, these data sets have been limited to a single regional insurance dataset or to the Medicare population. We sought to investigate risk factors for early PJI among patients undergoing total hip or knee arthroplasty (THKA).

Methods. All patients who underwent primary THKA between January 1, 2004 and July 31, 2014 with 12 months of continuous preceding medical and pharmacy insurance coverage were included in the study. The primary outcome of PJI required both a compatible procedure code and a diagnostic code during an inpatient stay from the time of THKA through 90 days after discharge. Comorbidities were based on ICD-9 codes in the preceding 12 months and patients with a prior diagnosis of PJI during that time period were excluded. Univariate and multivariate analysis was performed using logistic regression.

Results. A total of 147,053 patients underwent THKA during the study period, including 97,448 patients with TKA and 49,605 with THA. PJI occurred in 754 (0.5%) patients. Female gender was independently associated with lower odds of PJI (Figure). A number of biologically plausible factors were associated with increased risk, including chronic skin ulcer, obesity, substance use disorders, joint sarcoma, and malnutrition. The adjusted odds of PJI increased in a stepwise fashion with each increase in the Charlson comorbidity index (CCI), with those with a score of 4 or more having a nearly 2-fold adjusted odds of PJI compared with a score of 0 (OR 1.91; 95% CI 1.29 –2.82). Previously observed risk factors diabetes mellitus, rheumatoid arthritis, and chronic renal failure were associated with increased odds of PJI on univariate analysis, but not after adjustment.

Conclusion. These data identify several potentially modifiable risk factors for preoperative optimization, including obesity, malnutrition, chronic skin ulcers, and substance-use disorders. The level of comorbidity as assessed by the CCI provides a rough estimate of the increasing risk of PJI. The pathobiology of additional risk factors observed here deserves further study.



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

89. U.S. Combat-related Invasive Fungal Wound Infection (IFI) Epidemiology and Wound Microbiology: Afghanistan Theater 2009–2014

Anuradha Ganesan, MD, MPH[1,2,3]; Faraz Shaikh, MS[1,3]; Philip Peterson, MD[2]; William P. Bradley, MS[1,3]; Dana M. Blyth, MD[4]; Dan Z. Lu, MS[1,3]; Denise Bennett, MS[3,5]; Elizabeth Schnaubelt, MD[6]; Brian Johnson, BS[2]; Teresa Merritt, BS[1,3,4]; Nicole Flores, BSN[6]; Virginia Hawthorne, BSN[6]; Justin Wells, MD[2]; Leigh Carson, MS[1,3]; David R. Tribble, DrPH, MD[3]; [1]Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., Bethesda, Maryland; [2]Walter Reed National Military Medical Center, Bethesda, Maryland; [3]Department of Preventive Medicine and Biostatistics, Infectious Disease Clinical Research Program, Uniformed Services University of the Health Sciences, Rockville, Maryland; [4]San Antonio Military Medical Center, Fort Sam Houston, Texas; [5]Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc, Bethesda, Maryland; [6]Landstuhl Regional Medical Center, Landstuhl, Germany

Session: 30. It's not just Bones: Skin and Bones
Thursday, October 5, 2017: 8:30 AM

Background. Culturing combat-related wounds often yields both fungi and bacteria. It is difficult to differentiate fungal contamination from infection, and objective criteria that identify patients at risk for IFI are needed. This study was designed to characterize IFI among US combat casualties in the Afghanistan Theater.

Methods. This retrospective study includes subjects with any labortory evidence of fungi (either histopathology or cultures). Wounds with ongoing necrosis and labortory evidence of infection were classified as IFI). Wounds with labortory evidence of fungal infection, but without ongoing necrosis were classified as either highly suspicious wounds based

on objective clinical criteria (i.e., presence of systemic and local signs of infection and use of antifungals for ≥10 days) or non-IFI wounds if they failed to meet clinical criteria.

Results. Of 1932 subjects, 246 (12.7%) had labortory evidence of fungal infection. There were a total of 143 IFI wounds (n = 94), 157 non-IFI wounds (n = 96), and 113 high suspicion wounds (n = 56). IFI subjects had significantly higher injury severity scores (ISS median: 39.5 vs. 33), Sequential Organ Failure Assessment (SOFA) scores (7 vs. 2) and were more likely to require mechanical ventilation (66 vs. 28%). IFI patients also had higher ISS (93 vs. 84% with ISS >25) and SOFA scores (7 vs. 4) compared with the subjects with high suspicion wounds. IFI wounds often grew molds belonging to the order *Mucorales* compared with high suspicion (19 vs. 10%, P = 0.04) and non-IFI wounds (19 vs. 7%, P = 0.02). About half of the IF wounds grew fungi of the order *Mucorales* either isolated alone or in conjunction with other fungi, in comparison, 25% of the high suspicion wounds and 11% of the non-IFI wounds grew fungi of the order *Mucorales*. Three groups of fungi belonging to the order *Mucorales*, genus *Aspergillus* and *Fusarium* accounted for 83% of the IFI wounds and 74% of the high suspicion wounds.

Conclusion. Labortory evidence of fungal infection is common among combat casualties. Clinical characteristics and wound microbiology allows us to group subjects into groups at low and high risk of IFI. Fungi of the order Mucorales, genus *Aspergillus* and *Fusarium* should not be considered contaminants. The presence of these fungi should obligate close clinical follow-up and debridement as needed.

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

90. Increasing *Kingella* Identification in Bone and Joint Infections in Young Children

Rachel Quick, RN, MSN, CNS[1]; John Williams, MD[2,3]; Peter Cosgrove, MBBChBAO[4]; Kyle Kahlden, MD[5]; Marisol Fernandez, MD[1]; Lynn Thoreson, DO[6]; Sarmistha Hauger, MD[1]; [1]Pediatric Infectious Diseases, Seton Healthcare Family, Austin, Texas; [2]University of Texas at Austin, Dell Medical School, Austin, Texas; [3]Pediatric Orthopedics, Seton Healthcare Family, Austin, Texas; [4]Department of Pediatrics, Seton Healthcare Family, Austin, Texas; [5]Pediatrics, Seton Healthcare Family, Austin, Texas; [6]Pediatrcs, Seton Healthcare Family, Austin, Texas

Session: 30. It's not just Bones: Skin and Bones
Thursday, October 5, 2017: 8:30 AM

Background. *Kingella kingae* is an increasingly recognized pathogen among young children with bone and joint infections. Antibiotics given to cover methicillin-resistant *Staphylococcus aureus* are not effective against *Kingella,* and necessitate additional empiric antibiotics in this age group. Improving *Kingella* identification can narrow antibiotic choices and improve efficacy for long-term oral therapy.

Methods. We implemented a bone and joint infection guideline at a free standing children's hospital that called for early imaging, focal sampling, and polymerase chain reaction (PCR) testing for culture-negative specimens. The goal was to increase identification of *Kingella* and other pathogens to improve targeted antimicrobial therapy. Children 6 to ≤ 60 months of age with uncomplicated acute hematogenous osteomyelitis or septic arthritis between January 1, 2009–December 31, 2016, were included in this study. Outcomes of bacterial identification were measured.

Results. Charts for 49 cases that met criteria were reviewed. Prior to the algorithm, we identified *Kingella* in 4% (1/25) of cases. Following routine use of updated sampling and testing techniques, including PCR testing, *Kingella kingae* identification increased to 29% of cases (7/24; P = 0.02) and, in fact, was the predominant pathogen identified in this age group.

Conclusion. Identification of *Kingella* was enhanced as a result of changes to sampling and testing, including PCR testing (Figure 1). Post-implementation, *Kingella* was more commonly identified than *Staphylococcus aureus.* Widespread availability of PCR testing in the future may allow for the use of narrowed antibiotic therapy and targeted transition to oral antibiotics in young children with bone or joint infection.

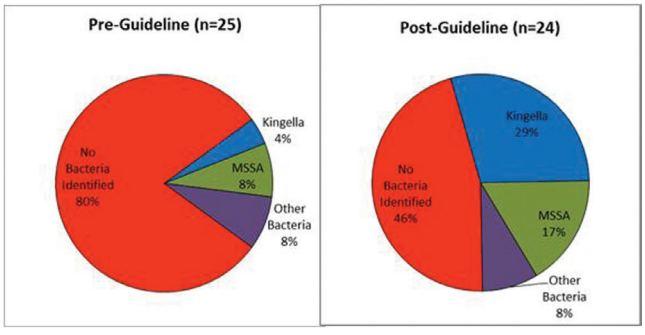


Figure 1. Bacterial identification pre and post guideline among children aged 6–60 months.

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

91. Microbiology of Vertebral Osteomyelitis and Implications on Empiric Therapy

Abbye Clark, BS; Neha Sharma, BS; Sharon Weissman, MD; Majdi N. Al-Hasan, MBBS; Caroline Derrick, PharmD, BCPS and Kamla Sanasi-Bhola, MD; University of South Carolina School of Medicine, Columbia, South Carolina

Session: 30. It's not just Bones: Skin and Bones
Thursday, October 5, 2017: 8:30 AM

Background. The management of vertebral osteomyelitis (VO) includes empiric antibiotic therapy while clinical cultures are being processed. Optimal antimicrobial therapy for VO, particularly when Gram-negative (GN) organisms are involved, is an area of ongoing debate. Narrow spectrum and oral antimicrobial therapy are preferred. The objective of this study was to identify characteristics of local pathogens and to formulate an institution-specific antibiotic protocol for empiric treatment of VO.

Methods. We conducted a retrospective case series study of adults diagnosed with VO from August 1, 2010 to August 31, 2015 at Palmetto Health Hospitals in Columbia, South Carolina. Cases identified by ICD-9 codes were included in the analysis if they met clinical, imaging and microbiology, criteria.

Results. Analysis is based on 150 cases of VO with a mean age of 61 years, a male predominance (91; 61%), and an average body mass index of 29 kg/m^2. Comorbidities included diabetes mellitus (69; 46%), tobacco use (33; 22%), and hemodialysis (20; 13%). Thirty-seven (25%) cases had recent related injury or vertebral surgery, and 14 (9%) had prior hardware. Bone, disc, or adjacent tissue cultures were obtained in 129 (86%) of cases; 60 (40%) of these had >1 sample taken. The remaining 14% had blood cultures alone. Thirty-six cases (24%) had culture negative VO. In the remaining 114 cases, 132 organisms were isolated. A total of 111 (84%) organisms were Gram-positive cocci (GPC). Of those, the majority was *Staphylococcus aureus.* (66; 59%) (26/66 were methicillin-resistant), coagulase-negative staphylococci (20; 18%) and *Streptococcus* spp. (17; 15%). *Enterobacteriaceae* accounted for 13/17 Gram-negative bacilli (GNB), with only one isolate of *Pseudomonas aeruginosa.* Of the GNB, 11/17 were susceptible to either ceftriaxone or ciprofloxacin.

Conclusion. There was a predominance of VO due to GPC suggesting that intravenous vancomycin monotherapy may be reasonable for empiric therapy in noncritically ill patients while awaiting Gram stain and clinical culture results. Addition of either ceftriaxone or ciprofloxacin to vancomycin would increase cumulative antimicrobial coverage from 84 to 92%.

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

92. Concordance of Results of Blood and Tissue Cultures from Patients with Pyogenic Spondylitis

Ji Yun Bae, MD[1]; Chung-Jong Kim, MD[1]; Uh Jin Kim, MD[2]; Kyoung-Ho Song, MD[1]; Eu Suk Kim, MD[1]; Seung Ji Kang, MD[3]; Myoung-Don Oh, MD, PhD[1]; Kyung-Hwa Park, MD[2]; Nam Joong Kim, MD, PhD[1]; [1]Department of Internal Medicine, Seoul National University College of Medicine, Seoul, Korea, Republic of South; [2]Chonnam National University Medical School and Hospital, Gwangju, Korea, Republic of South; [3]Department of Infectious Diseases, Chonnam National University Medical School, Gwang-ju, Korea, Republic of South

Session: 30. It's not just Bones: Skin and Bones
Thursday, October 5, 2017: 8:30 AM

Background. The aim of this study was to investigate the concordance of results of blood and tissue cultures in patients with pyogenic spondylitis.

Methods. We searched the patients with pyogenic spondylitis in whom micro-organisms were isolated from both blood and tissue cultures by retrospective review of medical records in three tertiary university-affiliated hospitals between January 2005 and December 2015. The species and antimicrobial susceptibility patterns of isolates from blood and tissue cultures were compared with each other.

Results. Among 141 patients with pyogenic spondylitis in whom micro-organisms were isolated from both blood and tissue cultures, the species of blood and tissue isolates were identical in 135 patients (95.7%, 135/141). Excluding the four anaerobic isolates, we investigated antimicrobial susceptibility patterns of 131 isolates of same species from blood and tissue cultures. Antibiotic susceptibility patterns were identical in 128 patients (97.7%, 128/131). The most common isolates were *Staphylococcus aureus* (86 patients; 85 concordant and 1 discordant), followed by streptococcus (24 patients; 22 concordant and 2 discordant), and *Escherichia coli* (8 patients; all concordant).

Conclusion. We suggest that a positive blood culture from patients with pyogenic spondylitis could preclude the need for additional tissue cultures, especially when *S. aureus* and streptococcus grew in blood cultures.

Table 1. Micro-organisms isolated from blood and tissues in 135 patients with pyogenic spondylitis

Concordant (n = 135)	
Staphylococcus aureus	85
Viridans streptococci	11
Streptococcus agalactiae	8
Escherichia coli	8
Enterococcus fecalis	4
Klebsiella pneumonia	2
Others	17
Discordant (n = 6)	
Blood	Tissue
Propionibacterium avidum	Coagulase-negative staphylococcus
Streptococcus constellatus, Actinomyces meyeri	*Streptococcus constellatus, Porphyromonas asaccharolytica*
Staphylococcus epidermidis, viridans streptococcus	*Staphylococcus epidermidis*
Staphylococcus aureus	*Staphylococcus aureus,* Nontuberculous mycobacteria