Conclusion. While rates of treatment failure in children diagnosed with CAP in the outpatient setting were low, macrolides were associated with a lower failure rate than treatment with ß-lactams. This may be due to residual confounding by indication or changing epidemiology of outpatient pneumonia.

Disclosures. T. Zaoutis, Astellas: Consultant, Consulting fee; Merck: Grant Investigator, Research grant; nabir: Consultant, Consulting fee.

85. Comprehensive Detection of Pathogens in Immunocompromised Children with Bloodstream Infections by Next-generation Sequencing
Kazuhiko Horiba, MD; Jun-Ichi Kawada, MD, PhD; Yusuke Okano, MD, PhD; Nobuyuki Tetsuka, M.D.; Takako Suzuki, MD; Shotaro Ando, MD, PhD; Yasuko Kamiya, MD, PhD; Yuka Torii, MD, PhD; Tetsuya Yagi, M.D., Ph.D.; Yoshiyuki Takahashi, MD, PhD; Yoshinori Ito, MD, PhD; Department of Pediatrics, Nagoya University Graduate School of Medicine, Nagoya, Japan; Department of Infectious Diseases, Nagoya University Hospital, Nagoya, Aichi, Japan

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Background. Bloodstream infection (BSI) is a severe complication in immunocompromised patients. Prompt identification of causative microorganisms would improve the outcome of BSI due to optimization of antimicrobial treatment. Next-generation sequencing (NGS) allows us to analyze comprehensively and quantitatively all microorganisms present in a clinical sample in comparison with blood culture. However, there are currently no established methods to identify causative pathogens by NGS.

Methods. BSI was defined by the following criteria in a clinical setting: (i) pathogen isolated from blood culture and (ii) fever ≥38.0°C or C-reactive protein >1.0 mg/dL. Thirty-five pediatric patients (12 with BSI and 23 with suspected BSI/negative blood culture) were enrolled. Plasma/serum samples were used for sequencing and the results were compared with those from blood culture. The bacterial reads per million reads of the sequence depth (BR) and relative importance values of the dominant bacteria (P1) were applied to identify causative pathogens.

Results. Sequencing reads of bacteria isolated in blood culture were identified by NGS in all plasma/serum samples at the onset of BSI. Additionally, bacteria isolated in blood culture were identical to the dominant bacteria by NGS in 8 of 12 patients with BSI. Causative microorganisms were detected when the NGS results fulfilled the criteria of BR >200 and P1 >0.5. In two patients with catheter-related BSI, causative bacteria were detected in the plasma/serum at 7 days before disease onset. Causative pathogens (Tatlockia micdadei, Escherichia coli, and human adenovirus 2) were identified in three of 23 patients in the suspected BSI group. A total of 62 resistance genes were detected in nine patients with sequences covering 5–100% of references.

Conclusion. An NGS-based approach has great potential for analysis of causative microorganisms in BSI and may help to diagnose a disease before disease onset. Antimicrobial resistance genes can also be found through sequence data processing.

Disclosures. All authors: No reported disclosures.

86. Passive Immunization with Anti-Pertussis Toxin Humanized Monoclonal Antibody Mitigates Clinical Signs of Pertussis Infection in Newborn Baboons
Jennifer Maynard, PhD; Annalee Nguyen, PhD; Roman Wolf, DVM; James Papin, DVM; Sheila Connolly, PhD; Michael Kalezko, MD, PhD; Chemical Engineering, University of Texas at Austin, Austin, Texas; University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma; Synthetic Biologics, Inc., Rockville, Maryland

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Background. Pertussis is a significant mortality risk in the developing world, killing up to 200,000 infants annually. Maternal vaccination as a strategy to protect newborns has shown some success, but is unlikely to capture all eligible mothers. Hu1B7 is a monoclonal antibody (mAb) that potently neutralizes pertussis toxin. Hu1B7, when administered as part of a binary mAb cocktail, demonstrated therapeutic efficacy in pertussis-infected weaning baboons. Here, the prophylactic potential of hu1B7 to protect infants during their first few months, when mortality risk is highest, was evaluated.

Methods. Neonatal baboons of normal gestational age (180 days ± 10), normal birth weight (~1.0 kg), and anti-Fha titer < 5 IU/ml (verifying no prior exposure to Bordetella species) were recruited into the study. At 2 days of age, treated baboons received hu1B7 (40 mg/kg, IV), while control animals were untreated. Serum levels of hu1B7 were followed for 5 weeks, at which time the animals were infected with 10^6 cfu of B. pertussis strain D420. Animals were monitored for clinical signs of disease.

Results. Six controls and seven treated animals were evaluated. All animals were heavily colonized with B. pertussis during the first week after infection. Controls developed significant leukocytosis, most coughed, and three required euthanasia. In contrast, white blood cell counts for all treated animals remained within the normal range, coughing was virtually absent, and all animals maintained normal activity. As expected for a humanized mAb in a nonhuman primate, hu1B7 had an elimination half-life of 11.8 ± 3.4 days.

Conclusion. Protection of newborn baboons from pertussis was achieved by mAb administration 5 weeks prior to pertussis infection. Hu1B7, when systemically present, mitigated the clinical signs of pertussis, including leukocytosis and coughing, but did not prevent bacterial colonization. Assuming a half-life in humans of 3 weeks, mAb administration at birth could potentially provide 4 months of prophylaxis and is a viable strategy to complement maternal vaccination. Moreover, strategies that extend the mAb half-life and lower the dose could further support developing world application.

Disclosures. J. Maynard, Synthetic Biologics, Inc.: Collaborator, Research support; A. Nguyen, Synthetic Biologics, Inc.: Collaborator, Research support; R. Wolf, Synthetic Biologics, Inc.: Consultant, Consulting fee.
87. Epidemiology and Trends of Pertussis among Infants: United States, 2000–2015

Catherine Bozio, PhD, MPH; Tami Skoff, MS; Tracy Pondo, MSPH; Jennifer Liang, TDVM; *Memorial and Vaccine Preventable Diseases Branch, Centers for Disease Control and Prevention, Atlanta, Georgia; *Respiratory Diseases Branch, Centers for Disease Control and Prevention, Atlanta, Georgia

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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%); CFR 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.

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 Tan, MD; Dennis Asante, MSc; Lindsey Sangaralingham, MPH

Session: 30. It’s not just Bones: Skin and Bones
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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 to 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

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

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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 Afghan theater.

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