

ampicillin (n = 153, 21.4%) and metronidazole (n = 135, 20%). **Conclusions:** This study shows high use of antibiotics among hospitalized patients in Haitian hospitals, especially in children aged <1 year. Almost all the antibiotics were prescribed as either empiric or prophylaxis therapy, with very few microbiology samples collected. These results suggest limited laboratory corroboration across hospitals to inform antibiotic use. Implementation of antimicrobial stewardship interventions is recommended to optimize antibiotic therapy and to mitigate antimicrobial resistance in hospital care settings, but adaptation of the methodology should be done in settings with limited laboratory capacity.

**Funding:** None

**Disclosures:** None

Doi:[10.1017/ice.2020.495](https://doi.org/10.1017/ice.2020.495)

#### **Presentation Type:**

Oral Presentation

#### **An Outbreak of New Delhi Metallo-Lactamase-5 (bla<sub>NDM-5</sub>)-Producing *Escherichia coli* in Companion Animals in the United States**

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**Background:** The emergence of carbapenem-resistant *Enterobacteriaceae* (CRE) in companion animals will be a game changer for infection prevention and control strategies in veterinary and human healthcare facilities. CRE have emerged as an important cause of human healthcare-associated infections and are a major clinical and public health problem. Although reports of CRE from animals are still very rare, they have been documented in China, Europe, and the United States. **Methods:** In April 2019, a passive veterinary surveillance system identified the bla<sub>NDM-5</sub> gene in an *E. coli* isolated from a dog in Philadelphia in July 2018. CRE are reportable to the Philadelphia Department of Public Health (PDPH), and in May 2019, the Matthew J. Ryan Veterinary Hospital at the University of Pennsylvania (MJRVH) reported a cluster of carbapenem-resistant *E. coli* (CR-*E. coli*) isolated from 14 animals to the PDHP. This cluster of 17 isolates, that all contained a bla<sub>NDM-5</sub> gene, was the first report of a CR-*E. coli* outbreak at a US veterinary facility. The first isolate, *E. coli* 24213-18, was sequenced on the Pacific Biosciences (PacBio) Sequel Sequencer and has been uploaded to GenBank. Whole genome sequencing was performed on all 17 isolates using the Illumina MiSeq platform. Antimicrobial resistance genes were identified from the National Center for Biotechnology Information Pathogen Detection Isolates Browser using AMRFinder. **Results:** PacBio sequencing confirmed *E. coli* ST167 and identified a circular IncFII plasmid of 139,547 bp that contained the bla<sub>NDM-5</sub> gene, along with many additional resistance genes. In June 2019, a retrospective review of hospital records was completed and showed that, from July 2018, 17 CR-*E. coli* were isolated from 14 animals. **Conclusions:** Control of CRE infections in human healthcare settings is challenging because the organisms colonize the gastrointestinal tract and can go undetected. The same issue is to be expected with companion animals. Healthcare-associated spread of CRE *E. coli* in a veterinary facility emphasizes the importance of rapidly identifying and characterizing carbapenem-resistant isolates from animals. Methods to control the spread of CRE in veterinary medical settings have not yet been studied, and related investigations will be critically important to limit the transmission of these pathogens in animal populations. The risk of transmission of CRE from animals to people is currently

poorly understood. CRE will be a major challenge across all health fields as these organisms become more prevalent in the community. It is likely that a 'One Health' approach to surveillance, infection prevention, and antimicrobial stewardship will be required to limit the spread and potential global dominance of CRE.

**Funding:** None

**Disclosures:** None

Doi:[10.1017/ice.2020.496](https://doi.org/10.1017/ice.2020.496)

#### **Presentation Type:**

Oral Presentation

#### **Appropriateness of Orthopedic Surgical Antimicrobial Prophylaxis Prescribing in Australia: Meaningful Metrics for Surgeons**

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**Background:** Orthopedic procedures are performed at high volumes in Australia. Thus, they are a commonly audited procedure group when measuring surgical antimicrobial prophylaxis (SAP) appropriateness and compliance in Australia and internationally. Recent analysis of the Surgical National Antimicrobial Prescribing Survey (Surgical NAPS) revealed high rates of inappropriateness, both procedurally (39.5%) and postprocedurally (53.0%). Inappropriate use can lead to patient harm and further increases the risk of antimicrobial resistance (AMR). Identification of factors associated with inappropriate orthopedic SAP prescribing may support the development of antimicrobial stewardship (AMS) interventions that are tailored to the orthopedic surgical setting to improve SAP. **Methods:** Surgical NAPS has been available to all Australian hospitals to complete from 2016; it supports the assessment of SAP appropriateness. Appropriateness is a composite measure based on antibiotic choice, timing of administration, dose and duration, applying the standardized *Surgical NAPS Appropriateness Assessment Guide*. Logistic regression was used to identify hospital, patient, and surgical factors associated with appropriateness. Adjusted appropriateness (AA) was calculated by generating marginal means from the multivariable model and averaging across all available covariates. Significance for multivariable analysis was determined as  $P < .05$ . Additional subanalyses were conducted on smaller subsets to calculate the AA for specific orthopedic procedures. **Results:** In total, 140 facilities contributed to orthopedic audits in the Surgical NAPS from January 1, 2016, to April 15, 2019, including 4,032 orthopedic surgical episodes and 6,709 prescribed doses. Overall appropriateness for prescribed procedural doses (n = 3,978) was 64.7% and was lower for prescribed postprocedural doses (n = 2,731, 48.3%). When antimicrobials were not prescribed, appropriateness was higher procedurally (n = 350, 89.7%) and postprocedurally (n = 1,127, 97.8%). When SAP was indicated, the most common reasons for inappropriateness, when prophylaxis was indicated, were timing for procedural doses (50.9%) and duration for postprocedural prescriptions (49.8%). The AA of each orthopedic procedure group was low for procedural SAP, ranging from 54.1% for knee surgery to 74.1% for total knee joint replacement. The adjusted appropriateness of postprocedural prescriptions was also low, ranging from 40.7% for hand surgery to 68.7% for closed reduction fractures. **Conclusions:** Orthopedic surgical specialties demonstrated differences across procedural and postprocedural appropriateness.