

Session: 235. Healthcare Epidemiology: Surgical Site Infections
 Saturday, October 6, 2018: 12:30 PM

Background. In countries with a high incidence of interpersonal violence involving firearms, gunshot wound (GSW) related infection is a regular and serious complication. However, limited evidence supports the efficacy of antimicrobial prophylaxis (AP) in resource restricted areas. At Tygerberg Hospital, South Africa, it is standard care for GSW patients to receive one dose of amoxicillin-clavulanic acid or cefazolin to prevent GSW-related infection. For various reasons protocol adherence can be suboptimal. This study aimed to assess the efficacy in regard to reduction of in-hospital GSW infection and to identify opportunities for practice improvement.

Methods. All GSW patients admitted between October 12, 2017 and January 3, 2018 were prospectively included. Data regarding injury characteristics, circumstances of the incident, type of AP and surgery were obtained. The occurrence of in-hospital GSW infection was monitored over 30 days or until discharge, whichever occurred first. Univariate analyses were performed to compare characteristics of patients with and without prophylaxis. A multivariate logistic regression model was used to obtain propensity scores. To correct for confounding, propensity score matching (PSM) and inverse probability weighting (IPW) methods were used to assess the effect of AP on the occurrence of GSW infection.

Results. A total of 165 consecutive patients were included. Hundred-and-three patients received AP according to protocol within 12 hours after admission, 62 patients did not. Only 63.9% of the multi-GSW patients and 69.1% of the patients with a fracture received AP. These conditions were associated with an uncorrected relative risk for infection of 2.08 (95% CI 1.32–3.26) and 1.81 (95% CI 1.08–3.04), respectively. PSM showed a reduced in-hospital GSW infection risk of 12% (95% CI 0.2–24%, $P = 0.046$) with AP. IPW showed that AP reduced the risk for infection by 14% (95% CI, 3–27%, $P = 0.015$).

Conclusion. Providing antimicrobial prophylaxis to GSW patients appeared to result in a clinically relevant lower risk of in-hospital GSW infection. In this study setting, optimization of provision of AP for all patients with multiple GSW's or a GSW-related fracture are opportunities for reduction of GSW infection.

Disclosures. All authors: No reported disclosures.

2147. Sample Size Estimates for Cluster Randomized Trials in Infection Control and Antimicrobial Stewardship

Natalia Blanco, PhD¹; Anthony D. Harris, MD, MPH¹; Laurence S. Magder, PhD¹; Kelly M. Hatfield, MSPH²; John A. Jernigan, MD, MS³; Sujun C. Reddy, MD²; Lisa Pineles, MA¹; Eli Perencevich, MD, MS, FIDSA, FSHEA³ and Lyndsay O'Hara, PhD¹; ¹Department of Epidemiology and Public Health, University of Maryland School of Medicine, Baltimore, Maryland, ²Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia, ³Iowa City VA Health Care System, Iowa City, Iowa

Session: 236. Healthcare Epidemiology: Epidemiologic Methods
 Saturday, October 6, 2018: 12:30 PM

Background. Cluster randomized control trials (CRCTs) are used frequently in the field of infection control and antimicrobial stewardship because randomization at the patient level is often not feasible due to contamination, ethical, or logistical issues. The correlation and thus non-independence that exists among individual patients in a cluster must be accounted for when estimating sample size for such trials, yet many studies neglect to consider or report the intracluster correlation coefficient (ICC) and the resulting coefficient of variation (CV) in rates between hospitals. The aim of this study was to estimate the sample sizes needed to adequately power studies of hospital-level interventions to reduce rates of healthcare-associated infections.

Methods. We calculated the minimum number of clusters or hospitals that would need to be included in a study to have good power to detect an impact of the intervention given a range of different assumptions. We estimated parameters needed for these calculations using national rates from the National Healthcare Safety Network (NHSN) for methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia, central-line associated bloodstream infections (CLABSI), catheter-associated urinary tract infections (CAUTI), *C. difficile* infections (CDI) and variation between hospitals in these rates. These calculations were based on the assumption that hospitals were uniform and moderate in size and were studied for 1 year.

Results. To study an intervention leading to a 50% decrease in daily rates and using the C vs. calculated from NHSN, 22 average-sized hospitals for MRSA bacteremia are needed, 34 for CAUTI, 9 for CDI, and 27 for CLABSI to have a statistically significant decrease with a type I error rate of 0.05 and a type II error rate of 0.8. If a 10% decrease in rates is expected instead, 709, 1205, 279, and 866 hospitals, respectively, are needed.

Conclusion. Sample size estimates for CRCTs are most influenced by the CV and the expected effect size. Given the large sample size requirements, it is likely that many CRCTs in hospital epidemiology are under-powered. We hope that these findings lead to more definitive CRCTs in the field of hospital epidemiology that are properly powered and more studies reporting their ICC or CV.

Disclosures. All authors: No reported disclosures.

2148. 100 Years of Sepsis: Using Topic Modeling to Understand Historical Themes Surrounding Sepsis

A. Doran Bostwick, MD¹; Kelly Peterson, MS²; Barbara Jones, MD³; Robert Paine, MD⁴; Matthew Samore, MD, FSHEA⁵ and Makoto Jones, MD, MS⁶; ¹Pulmonary and

Critical Care, University of Utah, Salt Lake City, Utah, ²Epidemiology, University of Utah, Salt Lake City, Utah, ³University of Utah, Salt Lake City, Utah, ⁴Pulmonary and Critical Care, University of Utah, Salt Lake City, Utah, ⁵University of Utah School of Medicine, Division of Epidemiology, Salt Lake City, Utah, ⁶Internal Medicine, VA Salt Lake City Health Care System, Salt Lake City, Utah

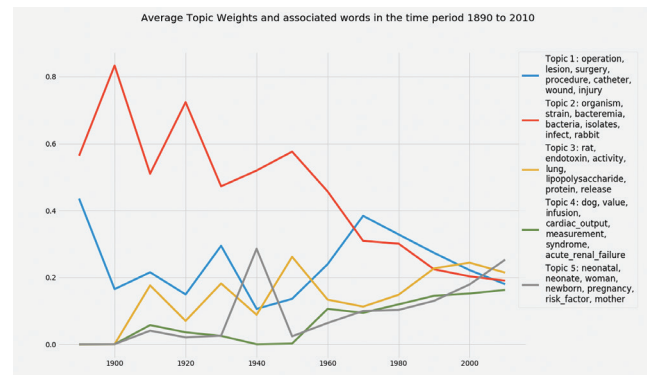
Session: 236. Healthcare Epidemiology: Epidemiologic Methods
 Saturday, October 6, 2018: 12:30 PM

Background. Medical research publications on sepsis have increased at an exponential rate, whereas our capacity to absorb and understand them has remained limited. We used topic modeling, a method that allows machines to distill large amounts of information into its elemental themes, to help us infer the discourse that led us to the present model/understanding of sepsis. Using this model to augment our understanding of sepsis, an evolving, networked and complex disease, we aimed to recognize connections that could be further explored and aid in knowledge discovery.

Methods. We extracted all abstracts from PubMed containing the terms "sepsis", "septic shock", and "septicemia" between 1890 and 2017 and retained the most informative words. Using topic modeling approaches based on Latent Dirichlet Allocation, we trained dynamic models to five topics from the corpus. We conducted a thematic analysis of topics across publication periods by examining the 30 most frequent words in each topic for each decade. We then fit a static topic model to the last 5 years. We compared the respective themes and their relatedness, and compared the frequency of each topic over the first and second halves of the century.

Results. Five themes emerged overall: surgery, physiology, microbiology, neonatal/maternal health, and cellular and endothelial responses to infection. When limited to the last 5 years, topics were: acute organ failure and ICU management, early sepsis management and cost, cellular and endothelial response, biomarkers and viruses, and neonatal infection. For the first half of the twentieth century, the bulk of research focused on microbiology while in the latter half of the century there was increased attention on the host response.

Conclusion. When visualizing the frequency of each topic over the last 100 years we found that the focus has shifted from the pathogen to the host response both from a cellular and physiologic perspective. In the last 5 years, biomarkers, early recognition and system management emerged as new themes. Reasons for this may include: evolution of scientific tools, treatments and statistical abilities, an increasing focus on healthcare cost, and ultimately an incorporation of the individual host response into the disease model.



Topic 1: 14.4%	Topic 2: 27.7%	Topic 3: 19.4%	Topic 4: 22.6%	Topic 5: 15.9%	Term Relevance
user safety injury	0.0049 blood culture	0.0001 septicemia	0.0001 c-reactive protein	0.0002 bacteremia	0.0005
injury	0.0036 department	0.0017 antibiotic	0.0001 syndrome	0.0004 neutro	0.0018
injury	0.0017 system	0.0001 safety	0.0001 medicine	0.0001 stress	0.0011
procedure	0.0015 research	0.0001 membership	0.0001 sensitivity	0.0004 neutro	0.0008
infect	0.0006 antibiotic	0.0001 gene	0.0001 specificity	0.0001 bloodstream infection	0.0003
infect	0.0001 sepsis	0.0001 function	0.0001 infect	0.0001 neutro	0.0009
infect	0.0001 emergency department	0.0001 gb	0.0001 vascul	0.0001 pathogen	0.0005
ARDS	0.0001 sample	0.0001 lung	0.0001 virus	0.0001 neutro	0.0002
confidence interval	0.0001 code	0.0001 system	0.0001 value	0.0001 neutro	0.0002
mechanical ventilation	0.0001 identification	0.0001 who	0.0001 symptoms	0.0004 neutro	0.0001
CDI	0.0001 infection	0.0001 production	0.0001 sample	0.0001 neutro	0.0001
length	0.0001 protocol	0.0001 site	0.0001 serum	0.0004 neutro	0.0001
injury	0.0001 estimate	0.0001 management	0.0001 system	0.0004 blood culture	0.0001
emergency department	0.0001 practice	0.0001 fu, g	0.0001 marker	0.0007 bacteremia	0.0001

Disclosures. All authors: No reported disclosures.

2149. Real-Time Nationwide Surveillance for Antimicrobial Resistance of Major Pathogens Using Automated Data Collection System in Korea: A KARS-Net Study

Kyungmin Huh, MD, MSc¹; Young Eun Ha, MD²; Doo Ryeon Chung, MD²; Jae-Hoon Ko, MD²; Hyunsoo Kim, MD⁴; Dongeun Yong, MD, PhD⁵; Kyungwon Lee, MD, PhD²; Hee Jae Huh, MD¹; Nam Yong Lee, MD, PhD⁵; Suhyun Oh, MD¹; Sukbin Jang, MD¹; Seokjun Mun, MD¹; Cheol-In Kang, MD¹; Kyong Ran Peck, MD¹; Jae-Hoon Song, MD, PhD² and the Korean Antimicrobial Resistance Surveillance Network (KARS-Net) Investigators; ¹Division of Infectious Diseases, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Korea, Republic of (South), ²Samsung Medical Center, Seoul, Korea, Republic of (South), ³Division of Infectious Diseases, Armed Forces Capital Hospital, Seongnam, Korea, Republic of (South), ⁴Department of Laboratory Medicine, The National Police Hospital, Seoul, Korea, Republic of (South), ⁵Department of Laboratory Medicine, Yonsei University College of Medicine, Seoul, Korea, Republic of (South), ⁶Department of Laboratory Medicine and Genetics, Sungkyunkwan University School of Medicine, Samsung Medical Center, Seoul, Korea, Republic of (South)

Background. Information on the most current status of antimicrobial resistance (AMR) in local and national levels has critical importance. However, collection and analysis of a large number of antimicrobial susceptibility test (AST) results often results in additional workload in healthcare facilities and latency in final reporting. We sought to develop an automated nationwide surveillance network in Korea.

Methods. Data collection servers were set up at each participating institutions, which collects AST results of every bacterial isolate from blood, cerebrospinal fluids, urine, and respiratory specimens. Collected results are anonymized and transmitted to central data server every day without human input. End-user can perform various analyses using data warehouse server through web interface. Only first isolates of same species from individual patients were included in analysis.

Results. A total of 19 hospitals located in various regions in Korea participated to the network. From January 2015 through December 2017, AST results of 347,356 isolates were collected. The proportion of MRSA among *S. aureus* ($n = 17,761$) was 65.3%, which declined gradually from 71.5 to 62.3% during study period ($P < 0.001$). The proportion of VRE increased from 29.3 to 36.3% ($P = 0.001$). Resistance rates of *E. coli* ($n = 63,628$) to third and fourth generation cephalosporins, fluoroquinolone, and piperacillin-tazobactam were 31.6, 23.0, 44.0, and 4.2%, respectively. Resistance rates of *K. pneumoniae* ($n = 16,875$) to same classes were 32.2, 28.1, 31.0 and 19.1%, respectively. Among *E. coli* and *K. pneumoniae*, 0.4 and 4.3% were resistant to carbapenem. Resistance rates of *P. aeruginosa* ($n = 12,895$) to carbapenem was 30.5%. However, 72.7% of *A. baumannii* isolates ($n = 9,885$) were resistant to carbapenem. Colistin resistance rate was still low at 0.5%.

Conclusion. We have established a fully automated nationwide surveillance network for AMR in Korea. Our system provided data on the most current status of AMR, which revealed increase in resistance rates among major Gram-negative pathogens compared with previous studies.

Figure 1. Schematic diagram of the Korean Antimicrobial Resistance Surveillance Network (KARSNet).

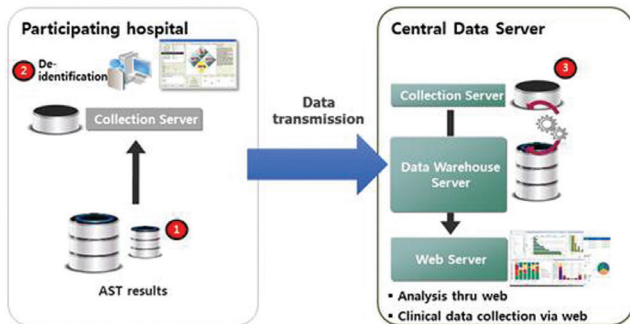


Figure 2. Temporal trends of the resistance rates of *S. aureus* and *E. faecium*.

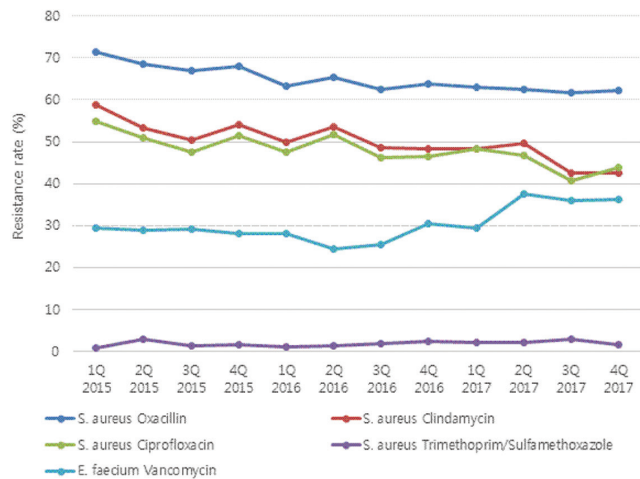
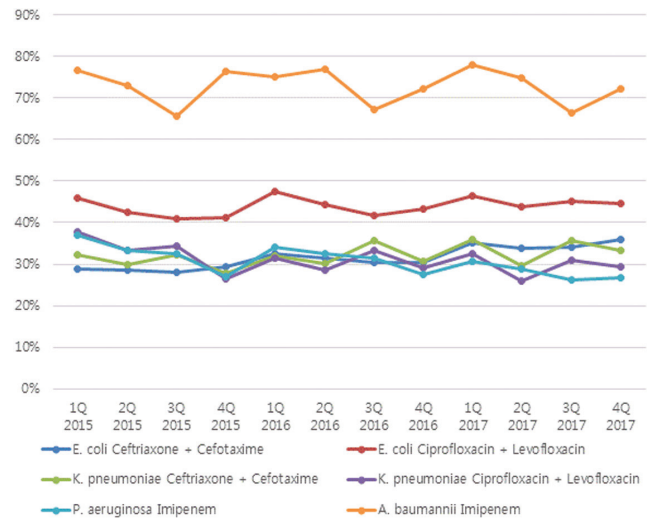


Figure 3. Temporal trends of the resistance rates of major Gram-negative species.



Disclosures. All authors: No reported disclosures.

2150. Discontinuation of Vancomycin-Resistant Enterococci (VRE) Surveillance and Contact Isolation in ICU and Transplant Units

Sandra Carlino, BS¹; Elizabeth Robilotti, MD, MPH² and Mini Kamboj, MD²;
¹Infection Control, Memorial Sloan Kettering Cancer Center, New York, NY,
²Memorial Sloan Kettering Cancer Center, New York, NY

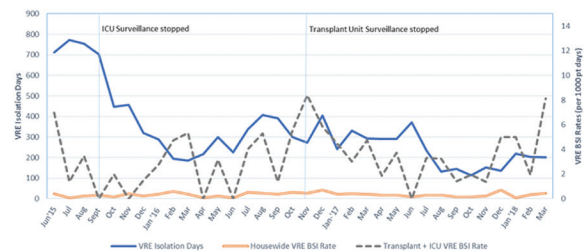
Background. The utility of active surveillance and contact isolation of VRE colonized individuals has not been established in non-outbreak and hyperendemic settings. The practice is onerous and resource intensive, with a hospital wide impact on patient flow. There is growing body of evidence suggesting that routine isolation of VRE colonized patients may not be beneficial. At MSKCC, VRE colonization rates in BMT and ICU units are ~ 33%, individuals with colonization only account for 80 % of all new VRE cases. Active surveillance had not shown any significant reduction in incident VRE. The objective of this study was to analyze the first year after discontinuation of active surveillance and routine contact precautions for VRE in the ICU. Outcomes assessed were house wide VRE BSI rate, unit specific BSI rates, and VRE-related nosocomial outbreaks. VRE-specific isolation days were simultaneously monitored.

Methods. Beginning in September 2015, we discontinued active VRE surveillance and isolation of colonized individuals in our 20 bed ICU, followed a year later by our 25-bed transplant unit. VRE BSI rates were observed for a 12-month period following these changes.

Results. The baseline house wide VRE BSI rate was 0.31/1,000 patient days. After discontinuation of practice in ICU, the ICU rate remained unchanged over the following 12 months (pre: 0.88/1,000 patient days vs. post: 0.77/1,000 patient days; P value = 0.83). No significant difference was seen in house wide or unit specific rates after the policy was subsequently implemented in the BMT unit (Figure 1). No VRE-related outbreaks were detected. There was a 50% absolute reduction in isolation days for VRE between the pre- and post-intervention periods.

Conclusion. Discontinuation of active surveillance and contact isolation of colonized individuals did not result in an increase in incidence of VRE BSI rates in a hyperendemic setting. A reduction in isolation beds facilitated patient flow, especially access to critical care services.

Figure 1



Disclosures. All authors: No reported disclosures.