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**Session:** P-42. HAI: Surgical Site Infections

**Background.** A survey was conducted in three hospitals, between July 2016 and June 2018, about surgical site infection (SSI) in patients undergoing surgeries to correct aortic artery aneurysms in the city of Belo Horizonte, with more than 3,000,000 of inhabitants. The general objective is to statistically evaluate such incidences and enable an analysis of the predictive power of SSI, through MLP (Multilayer Perceptron) pattern recognition algorithms.

**Methods.** Through the Hospital Infection Control Committees (CCIH) of the hospitals involved in the research, data collection on SSI was carried out. Such data is used in the analysis during your routine SSI surveillance procedures. Thus, three procedures were performed: a treatment of the database collected for use of intact samples; a statistical analysis on the profile of the collected hospitals and; an assessment of the predictive power of five types of MLPs (Backpropagation Standard, Momentum, Resilient Propagation, Weight Decay and Quick Propagation) for SSI prediction. The MLPs were tested with 3, 5, 7 and 10 neurons in the hidden layer and with a division of the database for the resampling process (65% or 75% for testing, 35% or 25% for validation). They were compared by measuring the AUC (Area Under the Curve - ranging from 0 to 1) for each of the configurations.

**Results.** From 600 records, 575 were complete for analysis. It was found that: the average age is 68 years (from 24 to 98 years); the average hospital stay is 9 days (with a maximum of 127 days), the death rate reached 6.43% and the SSI rate 2.78%. A maximum prediction power of 0.75 was found.

**Conclusion.** There was a loss of 4% of the database samples due to the presence of noise. It was possible to evaluate the profile of the three hospitals. The predictive process presented configurations with results that reached 0.75, which promises the use of the structure for the monitoring of automated SSI for patients undergoing surgery to correct aortic artery aneurysms. To optimize data collection, enable other hospitals to use the prediction tool and minimize noise from the database, two mobile application were developed: one for monitoring the patient in the hospital and another for monitoring after hospital discharge. The SSI prediction analysis tool is available at [www.nois.org.br](http://www.nois.org.br).

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### 881. Efficacy of Antibiotic Prophylaxis with Vancomycin in Cardiothoracic Surgery

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**Session:** P-42. HAI: Surgical Site Infections

**Background.** Due to the high incidence of methicillin-resistant *Staphylococcus aureus* (MRSA) at the Detroit Medical Center, vancomycin is now routinely part of the prophylaxis regimen for cardiothoracic (CT) surgery. The study aims to compare the rate and types of surgical site infections (SSIs) when vancomycin is added to cefazolin for CT surgery compared to cefazolin alone.

**Methods.** This was a retrospective cohort study conducted at two university-affiliated hospitals. Patients who underwent CT surgery between January 2008 and August 2017 and had a readmission for SSI within 90 days of procedure were included. Patients who received cefazolin were compared to patients who received both cefazolin and vancomycin for CT surgery prophylaxis. The primary outcome was incidence of SSIs within 90 days of surgery as defined by the Centers for Disease Control and National Healthcare Safety Network.

**Results.** Out of 828 patients who underwent CT surgeries, there were 32 patients readmitted within 90 days for SSI. SSI occurred in 4.7% of patients who received cefazolin monotherapy, and 2.4% of patients who received both cefazolin and vancomycin (p=0.095). There was no discernible difference in types of SSI between groups. Pathogens were isolated in 78% of SSIs, with 75% Gram-positive and 19% Gram-negative organisms. SSIs resulted in an average 9.8 days in the hospital and 28.9 days of antibiotic therapy, and led to a total of 15 additional procedures.

**Conclusion.** Vancomycin added to cefazolin for prophylaxis in CT surgery resulted in lower incidence of SSI, however the difference was not statistically significant.

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### 882. Evaluating the Risk Factors in Postoperative Infections Following Hysterectomy Procedures: Is Antibiotic Prophylaxis the Issue?

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**Session:** P-42. HAI: Surgical Site Infections

**Background.** Infectious complications after hysterectomy procedures are associated with an additional financial burden and length of stay for patients. In addition, post-hysterectomy surgical site infection is a metric tied to hospital ranking and financial penalties. The objective of this study was to evaluate the appropriateness of surgical prophylaxis for hysterectomies in patients with postoperative infections.

**Methods.** This is a 1:1 case-control study, matched based on the year of surgery and surgeon performing the procedure, of women  $\geq 18$  years who underwent hysterectomies between 2013 and 2019. Cases were diagnosed with infection(s) attributable to the procedure within 90 days post-hysterectomy. Patients who did not receive prophylaxis were excluded. The primary outcome of this study was to determine if postoperative infections following hysterectomies were due to inappropriate antibiotic prophylaxis. Secondary outcomes included hospital readmission and mortality. The primary statistical tests utilized included descriptive statistics and chi-square test.

**Results.** The study included 86 patients, 43 in each group. Thirty percent of cases and 7% of controls received inappropriate prophylaxis. For cases, reason for inappropriateness was due to underdosing of cefazolin (38%) and gentamicin (54%), and overdosing of cefotetan (8%). For controls, cefazolin (33%) and gentamicin (67%) were underdosed. Twenty-three percent of the cases and 14% of the controls received inappropriate intraoperative redosing. The most common reason for inappropriateness was timing (40% of cases vs 50% of controls) followed by missed intraoperative redosing (50% of cases vs 33% of controls). No difference was observed in the proportion of cases and proportion of controls who received inappropriate treatment (p=0.21). Eighty-eight percent of cases and 5% of controls were readmitted within 3 months (p<0.0001). Mortality was not noted in either group.

**Conclusion.** In this study, there was no statistically significant association between inappropriate antibiotic prophylaxis and infection. There was still a high incidence of inappropriate antibiotic prophylaxis in the cases. Therefore, education of providers on antibiotic dosing and criteria for intraoperative redosing is warranted.

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### 883. Evaluation of Post-operative Antibiotic Prophylaxis in Patients Undergoing Urologic Procedures

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**Session:** P-42. HAI: Surgical Site Infections

**Background.** Many national guidelines do not recommend post-operative antibiotic prophylaxis due to lack of literature supporting its use; however, they are frequently prescribed at ChristianaCare for urologic procedures. Use of post-operative antibiotics has not correlated with reduction in post-operative infections, and has been shown to increase risk for resistant infections, *Clostridioides difficile* (*C. difficile*) and acute kidney injury (AKI).

**Methods.** A single center retrospective chart review was conducted to evaluate endpoints of patients who underwent a urologic procedure and received post-operative antibiotics (intervention group) compared to those who did not (control group) from June 1<sup>st</sup> 2018 to September 1<sup>st</sup> 2019. The primary endpoint was to compare the incidence of post-operative infections, including surgical site infections (SSIs), bacteremia, and urinary tract infections (UTIs) between the intervention and control groups. The secondary endpoints included comparing the incidence of prespecified adverse outcomes, between the two groups.

**Results.** A total of 250 patients were included in this study. Baseline demographics were similar across a number of characteristics in both groups. There was no difference between the intervention and control groups in the incidence of post-operative bacteremia (p = 0.608), SSIs (p = 0.491) and 30 day UTIs (p = 0.307). The rate of AKI between both groups were similar. There was a higher percentage of resistant organisms seen in the intervention group compared to the control group (21.4% vs. 16.7%). The intervention group experienced an increase in post-operative antibiotic related adverse effects. Although a small number of patients were tested for *C. difficile*, there was one positive *C. difficile* PCR in the intervention group compared to zero in the control group.

**Conclusion.** The results of this study support withholding post-operative antibiotics in urologic procedures given no benefit in reducing post-operative infections and potential to increase adverse effects and development of resistant organisms. Efforts to change this current practice at our institution will be implemented via collaboration with the urology section and review of current order sets.

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### 884. Evaluation of Surgical Site Infections in Solid Organ Transplant Recipients with Beta-Lactam Allergies

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**Background.** Beta-lactam allergies (BLA) are common, but the prevalence and impact on solid organ transplant (SOT) recipients is largely unknown. We assessed the prevalence of BLA labels in SOT recipients at the time of transplant and evaluated their influence on surgical site infection (SSI) prophylaxis and SSI incidence.

**Methods.** All patients undergoing first heart, kidney, liver SOT at our institution were retrospectively reviewed (1/1/2015-12/31/2019). Antibiotic allergies, surgical antibiotic prophylaxis, and SSIs were abstracted from the electronic medical record. Reported BLA reactions were classified as potentially IgE-mediated, delayed, or non-allergic based on documentation. SSIs were reported according to NHSN definitions, and the incidence of SSI was compared between patients with and without reported BLA. SSI prophylaxis regimens were compared to institutional guidelines. Basic descriptive statistics were performed.

**Results.** Out of a total cohort of 751 patients (122 heart, 435 kidney, 209 liver, 4 multi-organ), 129 (17%) reported at least one BLA, with 104 (15%) with reactions to penicillins, 26 (3%) to cephalosporins, and 1 (0.1%) to carbapenems. Commonly reported reactions were rash (38%), hives (25%), and "other" (21%); 28% of documented reactions were not documented or classified as non-allergic. SSI developed in 7 (6.1%) of heart, 10 (2.5%) of kidney, and 16 (9.4%) of liver transplant recipients. Excluding 44 patients already on antibiotics for treatment of systemic infection, guideline concordant beta-lactam antibiotic surgical prophylaxis was administered to 6 (5.2%) of BLA group vs 490 (85.8%) in the non-BLA group ( $p < 0.01$ ); among the BLA group who did not receive a beta-lactam, 96 (83%) received a regimen concordant with institutional guidelines for penicillin allergy and 14 (12%) received guideline non-adherent regimens. Patients reporting BLA did not have a higher incidence of SSIs compared to those without BLA: 6 (4.8%) vs 27 (4.5%) respectively,  $p=0.86$ .

**Conclusion.** BLA prevalence in our SOT population was similar to previously reported rates, but many reported reactions were not allergic in nature. Pre-transplant allergy evaluation for patients with reported BLA may improve SSI antibiotic prophylaxis compliance.

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### 885. Feasibility of Observing Traffic Patterns (FOOT Patter) in Veterans Health Administration Operating Rooms

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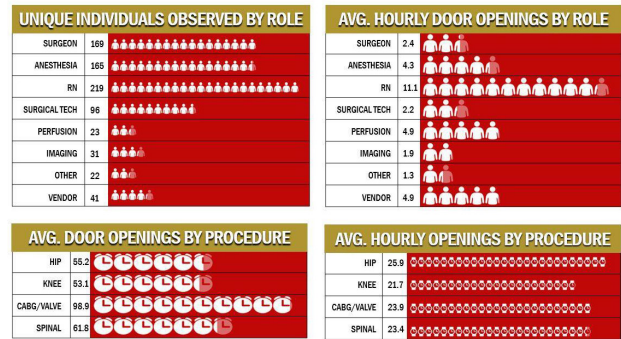
**Background.** Surgical site infections (SSIs) complicate nearly 6% of surgeries performed in Veterans Health Administration (VA) hospitals and occur despite adoption of practices known to reduce them. SSIs are associated with prolonged hospitalization and an increased risk of readmission, reoperation and mortality. Operating room (OR) door openings may increase SSI through disruption of desired OR air flow patterns and increased wound microbe counts. Our study objectives were to: 1) develop a methodological approach for collecting data on entry/exit traffic patterns in VA ORs and 2) characterize patterns across different surgery types.

**Methods.** Trained researchers from 10 VA-Centers for Disease Control and Prevention (CDC) Practice-based Research Network sites observed staff entering and exiting VA ORs. Staff were categorized and identified by role. Exits/entries were recorded on a standardized tracking sheet. Surgery type and observation duration from incision to closure were noted. Mean hourly door openings across procedure and role types were compared via a one-way ANOVA using Stata ver. 15.0.

**Results.** We observed 56 surgeries on 55 patients (Fig. 1). During 9,801 observation minutes, 766 staff opened doors 3,882 times. Door openings by role differed significantly ( $p < 0.001$ ) with nurses, perfusionists, anesthesia and vendors having the highest mean door-opening rate. Coronary artery bypass grafts (CABGs) accounted for most door openings and significantly greater surgical duration than other procedures

( $p=0.012$ ). Time-adjusted OR door opening rate was similar across procedure types at ~22-26 hourly openings ( $p=0.186$ ).

Figure 1. FOOT Patter results



**Conclusion.** The hourly rate of door openings varied notably by staff role. Our data show that measurement of OR movements is feasible although gaining access and approval to observe, achieving ideal observer positioning in complex floor plans, and potential misidentification of entering/exiting staff are challenges of direct methods. Scaling this study up may require automated processes. Studies exploring influences of traffic patterns on OR air quality metrics and impact on risk of SSI, identifying rationale and necessity for door openings and effective strategies for reducing unneeded door openings are needed.

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### 886. Impact of Type of Surgical Management on the Incidence of Recurrent Surgical Site Infections Following Hip and Knee replacements in Calgary, Alberta

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**Background.** Recurrent surgical site infections (SSIs) are associated with decreased quality of life for patients and increased economic burden to healthcare systems. Positive cultures at reimplantation and patient co-morbidities have been shown to increase the risk of recurrent SSI in hip and knee surgical site infections. Two-stage exchange has been considered for the most appropriate surgical management for these SSIs, however, it is unclear whether the type of revision arthroplasty and pathogen of the first SSI impacts recurrence rates.

**Methods.** A retrospective review of prospectively collected data on all complex SSIs following primary hip and knee arthroplasties between April 1 2012 and March 31, 2019, in Calgary, Alberta was performed. Patients were followed for two years post-index arthroplasty to determine initial management of first complex SSI (Debridement, antibiotics and implant retention (DAIR) vs DAIR+liner exchange vs one-stage vs two-stage), rate of recurrent complex SSI, and microbiological data for first and subsequent SSIs.

**Results.** Of the 142 complex SSIs, 95 (66.9%) were managed with DAIR and liner exchange, 25 (17.6%) were managed with DAIR, 13 (9.1%) with one-stage and 8 (5.6%) with two-stage procedures. The recurrence rate was 19/95 (20%) for DAIR and liner, 8/25 (32%) for DAIR alone, 2/13 (15%) with one stage, and 3/8 (37.5%) with two-stage. There was no significant difference in recurrence rates of complex SSI when stratified by surgical management. Of the pathogens, *Staphylococcus aureus* (*S.aureus*) (including methicillin-resistant *S. aureus* (MRSA)) accounted for 35.2% of total first SSI and 50% of recurrences. A significantly higher proportion of *S.aureus* infections (including MRSA) ended up with a recurrent infection compared to all other pathogens ( $p=0.045$ ). Of the 32 recurrences, 28.1% were due to the same pathogen as the initial SSI.

**Conclusion.** *S.aureus* was the most common pathogen causing initial and recurrent SSIs. This reinforces that *S.aureus* complex SSIs would likely benefit from early recognition and aggressive treatment. Recurrence of SSI was not impacted by type of revision arthroplasty. This study is limited by a small sample size. These findings contribute to the paucity of literature in this area and suggest a need for expansion to larger populations.

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### 887. Implementation of a Surgical Site Infection (SSI) Prevention Bundle: Patient Compliance and Experience

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