cases of hospital-onset and community-onset sepsis have not been characterized. The purpose of this study was to examine adherence to the sepsis bundle when sepsis arises in different areas of the hospital (ward, intensive care unit [ICU], or peri-operative area) compared with community-onset sepsis.

Methods. Retrospective cohort study using clinical data from four University of California hospitals. Admissions for sepsis from 2014 to 2016 were identified by diagnosis codes. Generalized linear models were used to estimate likelihood of adherence in terms of relative risk (RR). Time-to-event analysis involved Cox proportional hazards models and Kaplan–Meier curves.

Results. Overall, the sepsis bundle was administered in accordance with guidelines in 11.1% of cases. On multivariable analysis, cases of hospital-onset sepsis were less likely to receive the sepsis bundle within the recommended time frame (adjusted RR 0.57, P < 0.001) than were cases of community-onset sepsis, including a lower likelihood of having blood cultures drawn (adjusted RR 0.75, P < 0.001), serum lactate checked (adjusted RR 0.48, P < 0.001), or broad-spectrum antibiotics administered within 3 hours (adjusted RR 0.65, P < 0.001). Among the cases of hospital-onset sepsis, those arising in the ICU were more likely than those arising on the ward or in the perioperative area to receive the sepsis bundle within the recommended time frame (RR 1.83, P = 0.002). On time-to-event analysis, hospital-onset was associated with significant delays for all 3-hour bundle components except intravenous fluids.

Conclusion. Developing sepsis in one of the inpatient hospital areas was associated with a delay in guideline-adherent sepsis care. The ward and perioperative area experienced the longest delays. Further research is needed to determine whether these delays in care contribute to the increased mortality associated with hospital-onset sepsis.

1915. Predicting Real-Time Risk of Complications in the Postoperative Setting With Temperature as a Single Variable
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Session: 225. Clinical Practice Issues: HIV, Sepsis, QI, Diagnosis
Saturday, October 6, 2018: 12:30 PM

Background. No real-time postoperative risk stratification model exists to predict complications following surgery. The aim of this work is to understand if we can successfully risk stratify patients across three distinct surgeries using group-based trajectory modeling (GBTM) with only a single variable, temperature.

Methods. We performed a retrospective study of adults undergoing elective total knee arthroplasty (TKA), total hip arthroplasty (THA), colectomy, and pancreatectomy at an academic medical center from October 2014 to February 2018. Clinical data were abstracted using definitions from the National Surgical Quality Improvement Program (NSQIP) and temperature data were extracted from the Database Warehouse. GBTM was used to identify distinct clusters of patients with similar temperature trajectories. We calculated rates of complications and combined all NSQIP infectious and inflammatory complications into a single metric hence forth labeled inflammatory complications. Chi-square test was used to compare categorical variables.

Results. We identified 815 independent surgical patients: 307 TKA/THA, 195 pancreatectomy, and 313 colectomy patients. Rates of all NSQIP complications were 1.6% for TKA/THA, 35.4% for pancreatectomy and 10.2% for colectomy at 30 days after surgery. Pancreatectomy patients clustered into two temperature trajectories and both TKA/THA and colectomy patients (Figure 1) clustered into three groups. Inflammatory complication frequency trajectories were significantly different for all patients and trended toward significance for TKA/THA and pancreatectomy (Table 1).

Conclusion. Temperature trajectory modeling may help identify postoperative patients at higher risk for surgical complication after surgery. While risk stratification seems to work better in high complication surgeries or models with more patients, the promise of this modeling technique relies on the ability to identify high-risk patients with a single variable.

Figure 1. GBTM of temperature trajectories after colectomy

Table 1: Rates of Inflammatory Complications by Temperature Trajectory

| Trajectory | Proportion of Cases | Low Risk (%) | Medium Risk (%) | High Risk (%) | P-value |
|------------|---------------------|--------------|-----------------|---------------|---------|
| Low risk   | 313                 | 9.3% (150)   | 71.7% (140)     | 26.1% (23)    | 0.02    |
| Medium risk| 307                 | 27.1% (118)  | 41.8% (77)      | 31.1% (24)    | 0.05    |
| High risk  | 195                 | 52.8% (104)  | 2.0% (99)       | 4.2% (9)      | 0.08    |

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1916. Diagnostic Stewardship in Infectious Diseases Molecular Viral Testing: A Pilot Project
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Poster Abstracts • OFID 2018:5 (Suppl 1) • S551
Background. Diagnostic tests are a crucial part of clinical care. However, they can often result in unnecessary testing with no patient impact. Diagnostic stewardship seeks to modify the process of ordering, performing and reporting diagnostic tests to improve resource utilization and patient outcomes. We have identified infectious diseases viral molecular tests that are meant for outpatient management that are often ordered during a hospital stay. Our objective was to quantify how often these tests were ordered and acted upon, as well as the cost associated with them.

Methods. HIV quantitative PCR, HIV genotype and HCV genotype were selected as the target tests to be evaluated in this study. We measured the number of times these tests performed at Memorial Hermann Hospital TMC from January to December 2017. The individual and total cost of these tests were calculated. We sampled charts to determine whether the test had been ordered during or after the hospitalization.

Results. During the study period, a total of 512 HIV viral loads, 29 HIV genotypes, and 58 Hepatitis C genotypes were ordered. The total expense on the HIV viral load tests was $43,228, total expense on HIV genotypes was $8,669, and for Hepatitis C genotype was $43,055. Our chart sampling showed that HIV viral load test was not acted on 65% of the time, HIV genotype test was not acted on 62% of the time and HCV genotype was not acted on 50% of the time.

Conclusion. Three molecular viral tests that were used upon less than 50% of the time they were ordered, collectively added an expense of $94,952 over the course of a year at MHH TMC. A diagnostic stewardship program based on education and selective restriction of diagnostic testing may result in avoidance of unnecessary testing and substantial savings.

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1917. Diagnostic Errors in Bacterial Osteomyelitis in Children

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Saturday, October 6, 2018: 12:30 PM

Background. Delayed or erroneous diagnoses of bacterial infections may cause adverse outcomes in children. Bacterial osteomyelitis has a low incidence, is only infrequently encountered by primary care pediatricians, and has obscure symptoms in children that make an early and accurate diagnosis challenging. The aim of this study was to determine the incidence and causes of diagnostic errors in pediatric patients in whom bacterial osteomyelitis was finally diagnosed.

Methods. Children who received a definitive diagnosis of acute or chronic bacterial osteomyelitis were enrolled at Tokyo Metropolitan Children’s Medical Center between April 2010 and September 2017. The initial diagnoses were retrospectively reviewed by two pediatricians to evaluate the incidence of misdiagnosis and the types of diagnostic error involved, such as system-related and cognitive errors. Each type of error was subcategorized into associated factors including patient, task, team, organizational/management, and individual factors, work conditions, and flaws in data gathering, information processing, and verification. The cumulative results for each pediatrician were averaged. A kappa statistic was calculated to assess interobserver agreement.

Results. The total incidence of misdiagnosis of bacterial osteomyelitis was 36% (27/75), of which 33.3% (13/39) and 38.9% (14/36) were misdiagnoses of acute and chronic osteomyelitis, respectively. The main type of diagnostic error was cognitive (89.3%). The number of subcategorized factors was 2.5 per diagnostic error. In cases of cognitive errors, the associated factors were flaws in data processing, data gathering, and verification, at 20 (30.2%), 15 (22.6%), and 17 (24.6%) cases, respectively. Interreviewer agreement was substantial, with kappa = 0.993 for the primary analysis and 0.805 for the subgroup analysis.

Conclusion. Cognitive errors were the primary cause of the misdiagnosis of bacterial osteomyelitis. Educational approaches focusing on improving data gathering, processing, and verification should improve diagnostic accuracy.

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1918. Is It Time to Assess the Role of Blood Cultures in the Current Practice of Medicine?

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Session: 225. Clinical Practice Issues: HIV, Sepsi, QI, Diagnosis
Saturday, October 6, 2018: 12:30 PM

Background. Today’s physician must deal with data from traditional tests, as well as new sources like smart phones and texting, the electronic medical record (EMR), septic shock and sepsis “bundles,” and the availability of PCR for the rapid identification of organisms, all in an environment of antibiotic stewardship programs. We need to assess which methods of data collection are meaningful and efficient, and which can be modified.

Methods. We reviewed a handwritten log of the preliminary demographics of patients with positive blood cultures from a 6-year study period, then confirmed this summary with the financial department, as well as the locations where blood cultures were drawn, and the charges generated. Our data identify those who died, but do not identify the cause of death nor the causative nature of the patient’s bacteremia for mortality.

Results. We found that the majority of orders were for “two sets of blood cultures 80 minutes apart,” but there were multiple orders for one or more additional sets; in many cases, additional cultures were ordered because of temperature elevation or leukocytosis; in other instances, the indication for the blood culture was not clear. The number and type of blood cultures ordered for individual patient encounters came at the discretion of the individual physician. The percentage of positive blood cultures was approximately 5%, of an average 17,000 cultures done per year, with total charges of more than $60 M over a 6-year period. Thus, we have a common test with low sensitivity resulting in a high financial expenditure.

Conclusion. Since data sharing among medical teams is now easier because of new tests and electronic data gathering advances in medicine, it is also easier to assess which traditional patterns of data collection are most effective and which should be eliminated. All blood culture laboratories should be reviewed and assessed for efficacy and efficiency by the appropriate personnel. National organizations should consolidate and codify one set of clinically relevant and case-based guidelines from those which are available.

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1919. Outpatient Care-Seeking Prior to Acute Respiratory Infection

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Saturday, October 6, 2018: 12:30 PM

Background. Acute respiratory infection (ARI) diagnoses encompass syndromes such as pneumonia and bronchiolitis, and are among the leading causes of hospitalization. While outpatient care could present an opportunity to prevent subsequent hospitalization, few studies have measured healthcare utilization preceding hospitalization. We characterized outpatient visits in the 2 weeks prior to ARI hospitalization using commercial insurance and Medicaid claims in MarketScan data from 2012 to 2014.

Methods. We included inpatients with an ICD9 discharge diagnosis for ARI (460–466), pneumonia (480–486), or influenza (487–488) and evaluated outpatient records ≤14 days prior to admission, excluding the day of admission. We defined an outpatient visit as health encounters with a reasonable potential for medical care receipt (e.g., medical device delivery). We used the prevalent (i.e., 12 months of medical records to define patients’ Charlson Index and health care utilization, including any prior hospitalizations and preventive and ambulatory care sensitive condition (ACSC) visits. Severe outcomes were defined as intensive care unit admission or death. We used multivariable logistic regression stratified by age group to evaluate demographic, clinical, health utilization, and outcome factors associated with outpatient care prior to admission.

Results. We identified 407,096 ARI hospitalizations, among which 60% of patients had ≥1 outpatient visit prior to admission; 36% of visits occurred ≥1 day prior to admission. Children aged <1 were more likely to have a preceding visit compared with other age groups (67% vs. 57% to 59%, P < 0.001). In all age groups, persons with preventive care and ACSC visits in the past year; a Charlson score ≥2, female sex, uninsured, non-subsidized health plans, and higher employment were more likely to have a preceding outpatient visit. Patients with severe outcomes were significantly less likely to have a preceding visit, while specific diagnoses varied by age group (figure).

Conclusion. In a population of insured individuals, only 60% received outpatient care in the 2 weeks prior to ARI hospital admission. A greater understanding of health-care seeking behaviors for potentially preventable hospitalizations is needed.

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