*Background.* Upper Respiratory Infections (URI) represent a significant disease burden to children worldwide. Clinicians must rely on clinical acumen and evidence-based medicine to responsibly prescribe antimicrobials to curb the rise of antimicrobial-resistant pathogens. We propose a model to help clinicians predict the odds of hospital transfer upon initial evaluation of pediatric patients presenting with URI in a low to middle income setting.

Methods. We performed a prospective cohort study of 2,311 children aged 3 months–15 years enrolled in an outpatient government health clinic in Managua, Nicaragua over a 5-year period. Symptoms, examination findings, laboratory studies, diagnoses, and data on antimicrobial use were collected. Primary outcome was hospital transfer. Using forward-selection logistic regression, we constructed a model of the risk factors and examination findings most likely to predict hospital transfer. WHO criteria were used to risk-stratify pneumonia cases. We examined the frequency and type of antimicrobials used. We then applied Hay et al.'s STARWAVe model to examine its utility in our population.
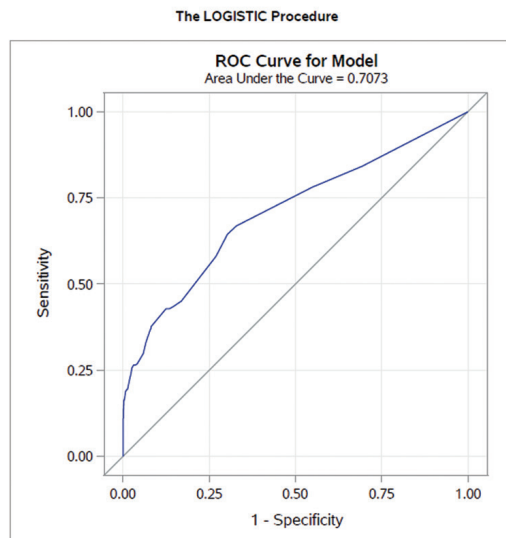
Results. Of the 2,311 children that participated in the cohort between 2011 and 2015, 2,155 children (93%) experienced one or more URI. Those children experienced a total 18,826 URI episodes. 5,383 (28.6%) of URI cases received antibiotics. 332 URI cases were transferred to the hospital, of which 167 (50.3%) were given antibiotics. Age <2 years, male sex, having four or more symptoms, vomiting, poor appetite, diagnosis of "flu-like illness," wheezing, subcostal retractions, rhonchi and fever were all independently associated with hospital transfer ($P < 0.05$). STARWAVe had fair predictive value (AUC = 0.6709) but our model had better predictive value (AUC = 0.7011). Ninety percent of all pneumonia cases were properly managed by WHO criteria.

Conclusion. We defined a set of clinical criteria that predict hospital transfer in a low- and middle-income community setting. We also examined the fit of a validated predictive model developed in a high-income setting and found that this model performed reasonably well in our setting. Overall, most pneumonia cases were treated effectively by WHO criteria indicating that local physicians were properly prescribing antimicrobials.

Odds of Hospital Transfer as a Function of Starwave Model Risk Factors

The LOGISTIC Procedure

ROC Curve for Model
Area Under the Curve = 0.6709
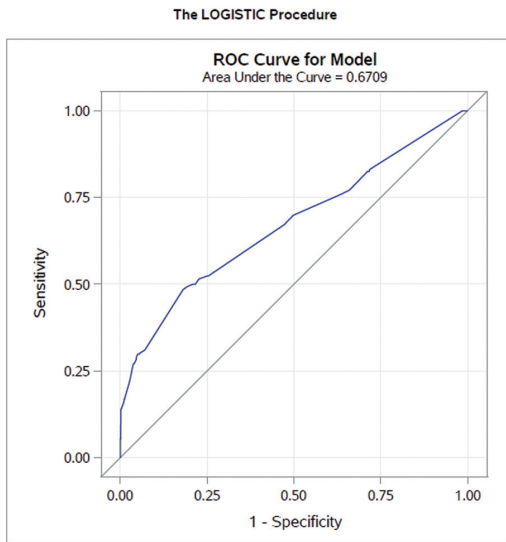
Odds of Hospital Transfer as a Function of Best Predictors Including Age

The LOGISTIC Procedure

ROC Curve for Model
Area Under the Curve = 0.7073

Disclosures. **All authors:** No reported disclosures.

279. A Decision Tree Using Clinical Characteristics to Predict a Hospitalized Child's Risk of a Multidrug-Resistant Gram-Negative Bloodstream Infection

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Session: 53. Pediatric Antimicrobial and Diagnostic Stewardship
*Thursday, October 4, 2018: 12:30 PM*

Background. As the threat of multidrug-resistant Gram-negative (MDRGN) bacteria rises, recognizing children at high risk of bloodstream infections with bacteria resistant to commonly prescribed empiric antibiotics is critical. We developed a decision tree to predict which pediatric bloodstream infections were due to MDRGN bacteria resistant to cefepime or piperacillin–tazobactam, commonly prescribed empiric antibiotics.

Methods. We conducted a longitudinal retrospective cohort study at the Children's Hospital of Pittsburgh including all admitted patients with a Gram-negative bloodstream infection from June 2009 to June 2015. Episodes of bloodstream infection were considered unique if at least 30 days had elapsed since the previous bloodstream infection. Logistic regression was performed to identify notable risk factors. A decision tree describing the risk of an MDRGN infection was developed using recursive partitioning based on clinical characteristics available at the time of presentation.

Results. Six hundred eighty-nine episodes of Gram-negative bloodstream infections occurred during the study period among 387 patients. Twenty-eight percent of infections were multidrug-resistant (MDR). The decision tree separated patients into higher or lower risk groups based on history of prior carbapenem treatment for seven or more days, having a prior MDR infection within 6 months, intestinal transplant status, age 3 years or older, and seven or more prior episodes of bacteremia. The sensitivity to classify high risk of MDR was 46% and the specificity was 92% based on leave one out cross validation. For patients who had more than one episode, 30% of initially non-MDR infections were subsequently MDR.

Conclusion. A decision tree using readily available clinical characteristics may be helpful to identify pediatric patients at higher risk of bloodstream infection due to an MDRGN organism resistant to common empirical antibiotic therapy.

Figure 1. Decision tree. Risk of resistance presented as percentage. Abbreviations: Y- yes; N- no. Gray hexagons represent high-risk of multidrug-resistant (MDR) groups while squares represent low-risk of MDR groups.
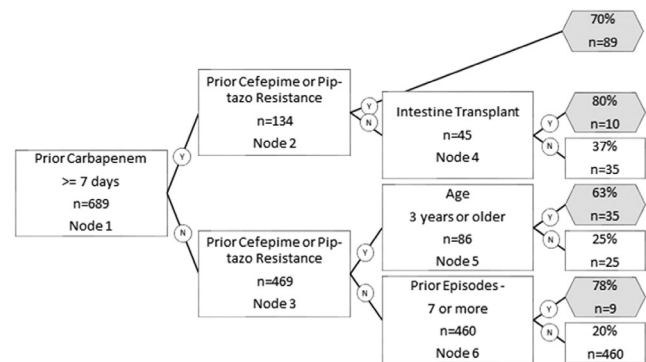
Disclosures. **All authors:** No reported disclosures.

280. The Impact of a Revised Neutropenic Fever Guideline on Vancomycin-Resistant *Enterococcus* Rates in Pediatric Oncology Patients

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Background. Data on the impact of empiric febrile neutropenia (FN) guidelines on resistant bacteria in pediatric oncology patients are limited. We implemented a risk-stratified guideline for empiric FN antibiotics, limiting vancomycin use to high-risk patients for 48 hours if cultures were negative. Our aim was to assess the impact of this intervention on rates of vancomycin-resistant *Enterococcus* (VRE) and vancomycin use.

Methods. We conducted a retrospective, quasi-experimental study of oncology patients ≤ 18 years with FN admitted from 2010 to 2014. Microbiologic data and inpatient antibiotic use were obtained by chart review. Risk strata incorporated diagnosis, chemotherapy phase, Down syndrome, septic shock, and typhlitis. The primary outcome was VRE incidence; all VRE isolates were included but active surveillance

was only performed in intensive care units (ICUs) in both periods. We compared VRE incidence and antibiotic days of therapy (DOT) before and after the intervention using interrupted time-series analysis with segmented Poisson regression with auto-correlation.

Results. We identified 183 patients with 765 admissions and 382 FN episodes pre-intervention, and 185 patients with 830 admissions and 385 FN episodes post-intervention. The proportion of high-risk patients was 51% pre vs. 45% post ($P = 0.06$). Median length of stay for FN admissions was 7 days (IQR: 4–22) preintervention and 5 days (IQR: 3–15) postintervention ($P \leq 0.01$). Median duration of empiric vancomycin decreased from 5 days (IQR: 3–9) pre- to 3 days (IQR: 3–4) postintervention ($P \leq 0.01$). Empiric vancomycin DOT/1,000 FN days decreased from 287 preintervention to 199 postintervention ($P \leq 0.01$). Incidence of VRE/1,000 patient-days decreased significantly from 1.71 preintervention to 0.45 postintervention (IRR=0.26, 95% CI 0.09–0.80; $P = 0.02$). The proportion of VRE isolates representing colonization did not differ significantly pre- and postintervention (50% vs. 67%).

Conclusion. Implementation of an FN guideline limiting vancomycin exposure was associated with decreased incidence of VRE among pediatric oncology patients. Antimicrobial stewardship interventions are feasible in immunocompromised patients and can impact antibiotic resistance.
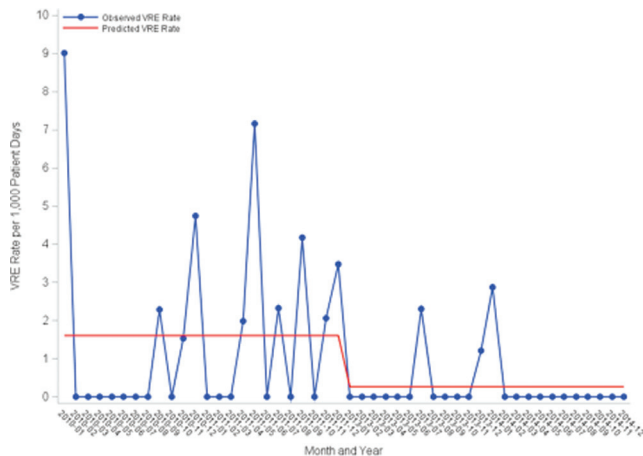
281. Cefdinir Prescribing Increased in Low-Income Children in Kentucky From 2012 to 2016

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Background. Cefdinir is frequently prescribed to pediatric outpatients with respiratory infections despite a lack of first-line indications. The use of cefdinir should be limited given its poor efficacy against *Streptococcus pneumoniae,* suboptimal pharmacokinetic and pharmacodynamic parameters, and high cost. We describe cefdinir use over time in the pediatric Kentucky (KY) Medicaid population including rates of use, associated diagnoses, and cost to the Medicaid system.

Methods. We reviewed KY Medicaid pharmacy and medical claims from 2012 to 2016 for all patients <20 years of age. Cefdinir prescriptions were identified by national drug codes and linked to medical claims within 3 days prior to the prescription date. Diagnoses were classified into the following groups by ICD9 and ICD10 codes: acute otitis media (AOM), sinusitis, pharyngitis, lower respiratory infections, and urinary tract infections. Upper respiratory infections (URIs) commonly caused by viruses (e.g., nasopharyngitis, bronchitis, cough) were categorized as presumed viral infections. Cost data were extracted from pharmacy claims. Cochran-Armitage was used to test for trends across the study period.

Results. Cefdinir prescriptions significantly increased from 60,334 (8% of all antibiotic prescriptions) in 2012 to 99,053 (13% of all antibiotic prescriptions) in 2016 ($P < 0.001$). Cefdinir use in rate per 1,000 children increased from 195 in 2012 to 294 in 2016. Medicaid spending on cefdinir increased from $2.3M (15% of all antibiotic spending) in 2012 to $4.7M (27% of all spending) in 2016. Eighty-eight percent of pharmacy claims for cefdinir had an associated medical claim within 3 days prior to prescription. Indications associated with cefdinir are summarized in Figure 1. Three groups accounted for the majority of cefdinir use: AOM, presumed viral infections, and pharyngitis.

Conclusion. Outpatient cefdinir use in pediatric patients served by KY Medicaid significantly increased over the study period. Much of this use was inappropriate. Antibiotics are not useful against viral infections, which accounted for 23% of cefdinir use. When antibiotics are indicated for bacterial URI, agents with better pneumococcal coverage are preferred. Preventing overuse of this costly, broad-spectrum antibiotic is an important focus for antimicrobial stewardship efforts.

Figure 1: Indications associated with cefdinir
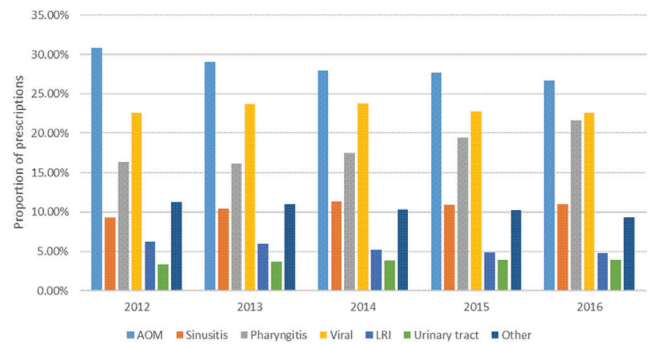
282. Adherence to Acute Otitis Media guidelines in Pediatricians' Offices, Urgent Care Centers, and a Pediatric Emergency Department

Shamim Islam, MD, DTM&H[1] and Amanda Hassinger, MD, MS[2]; [1]University at Buffalo, State University of New York, Buffalo, New York, [2]University at Buffalo School of Medicine and Biomedical Sciences, Buffalo, New York

Background. Acute otitis media (AOM) is a common diagnosis in outpatient pediatrics that often results in antibiotic prescriptions. In 2013, revised clinical practice guidelines for AOM by the American Academy of Pediatrics (AAP) recommended reserving antibiotics and a watchful waiting (WW) approach in most scenarios; amoxicillin ±clavulanate as first-line agents if treating; and courses of >7 days to be clearly indicated only in severe cases in those ≤2 years old. Adherence to AOM guidelines amongst pediatric providers, especially in nonacademic outpatient settings, has not been well characterized.

Methods. In a large community-based sepsis point prevalence study, diagnosis, antibiotic prescription, and other data were collected from all patients aged 0 to 18 years seen on September 5, 2016, December 5, 2016, March 6, 2017, and June 5, 2017, in the Emergency Department (ED) of the Women and Children's Hospital of Buffalo, 11 primary pediatric (PMD) offices, and 2 private urgent care centers (UCC) in Buffalo, NY. For this secondary analysis, all children with a provider diagnosis of acute otitis media (AOM) were identified. Adherence to AAP AOM guidelines were analyzed and compared relative to clinical care setting.

Results. Of 2,062 sick visits, 6% (121) were diagnosed with AOM, and in 82% of these antibiotics were prescribed: 91% (39/43) in ED; 70% (21/30) in UCC; 83% (40/48) in PMD, $P = 0.071$. When prescribed, 69% of antibiotics were first-line agents. In UCC and PMD, oral third-generation cephalosporins were the most common non-first-line agents, followed by azithromycin (20% and 8% of all antibiotic prescribed cases respectively). Ninety percent of antibiotic courses were ≥7 days. There were no differences in prescribing practices between outpatient settings

Conclusion. A recent study found that WW is clinically appropriate in >50% of pediatric AOM and overall cost-effective. However, in our analysis, antibiotics are still being prescribed in four out of five cases. Non-first-line agents, which are excessively broad and/or suboptimal in targeting the main pathogens for pediatric AOM, are given in over a quarter of prescriptions. Increasing awareness and adherence to AOM guidelines, in various outpatient settings, should be a major target of pediatric antibiotic stewardship efforts.

283. Antibiotic Utilization for Pneumonia and Other Respiratory Infections in Pediatricians' Offices, Urgent Care Centers, and a Pediatric Emergency Department

Shamim Islam, MD, DTM&H[1] and Amanda Hassinger, MD, MS[2]; [1]University at Buffalo, State University of New York, Buffalo, New York, [2]University at Buffalo School of Medicine and Biomedical Sciences, Buffalo, New York

Background. Pneumonia (PNA) and other respiratory infections are common diagnoses in outpatient pediatrics and often result in antibiotic utilization. Professional society guidelines recommend narrow-spectrum agents, namely amoxicillin/ampicillin, as empiric therapy for the majority of pediatric community-acquired pneumonia. In most respiratory infections other than PNA, antibiotics are not indicated. Adherence to PNA guidelines, and antibiotic use for other respiratory infections, in the varied outpatient settings in which children are seen, has not been well characterized.

Methods. In a large outpatient sepsis point prevalence study, various data were collected from all patients 0 to 18 years of age seen on September 5, 2016, December 5, 2016, March 6, 2017, and June 5, 2017, in the Emergency Department (ED) of the Women and Children's Hospital of Buffalo, 11 primary pediatric (PMD) offices, and 2 private urgent care centers (UCC) in Buffalo, New York. For this secondary analysis, all children with a provider diagnosis of PNA, bronchitis, bronchiolitis, and upper respiratory infection (URI), were identified. Antibiotic utilization and adherence to Pediatric Infectious Diseases Society PNA (2011) guidelines were analyzed and compared relative to clinical care setting.