Session: P-63. Pediatric Antimicrobial Stewardship (inpatient/outpatient pediatric focused)

Background. Antibiotic overuse leads to antimicrobial resistance, adverse events, and excess costs. Antibiotic time-outs (ABTOs) offer a structured approach to reevaluate antimicrobial regimens, but implementing and maintaining ABTOs can be challenging. In this project, we built on previous ABTO implementation in adult inpatient units to incorporate ABTOs in pediatrics using quality improvement (QI) methods.

Methods. We identified champions, including attending physicians, residents, nurses, team coordinators, and pharmacists. Following pilot testing, ABTOs began in November 2019 and January 2020 for two general pediatric teams, and in June 2020 in the pediatric ICU (PICU). Patients were eligible for an ABTO if they had been on antibiotics for 36-72 hours. ABTOs were documented in the electronic medical record (EMR) with a structured note template. These notes along with patient antimicrobial regimens were extracted and analyzed using an automated EMR query. Metrics included: (1) Proportion of ABTO-eligible patients with an ABTO; (2) Proportion of ABTOs conducted within goal time frame; (3) Documented plan changes in ABTO (e.g. change IV antibiotics to PO); and (4) Proportion of documented changes completed within 24 hours

Results. To date, there have been 342 pediatric ABTOs over 145 team weeks on the general pediatrics teams and 50 weeks in the PICU, representing 96.9% of eligible patients. 77.8% of ABTOs were completed within the recommended time frame. A majority of ABTOs (67%) resulted in no change to antibiotic regimen, and 18% of patients had already had de-escalation. In 10.5% of patients, the ABTO led to a de-escalation (antibiotics discontinued in 2%, converted from IV to PO in 8.5%). 86.8% of planned changes occurred within 24 hours of ABTO.

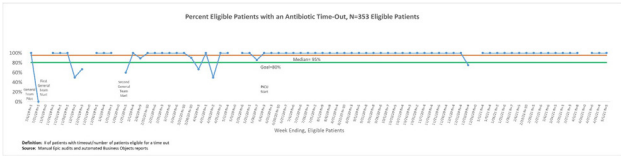

Figure 1. Compliance with antibiotic time-outs over time, by week. The green line represents the goal of 80%, and the orange line represents median performance.

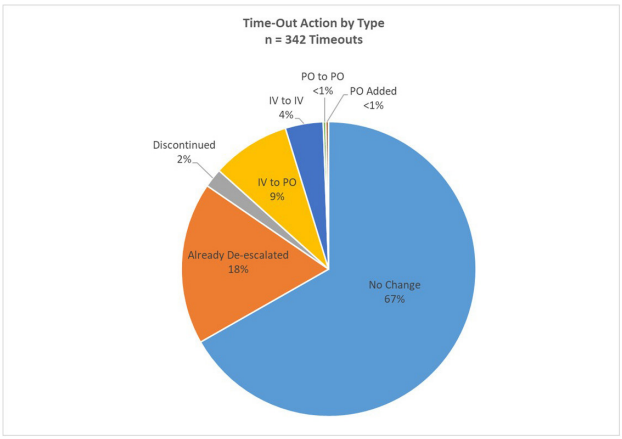

Figure 2. Planned changes to antimicrobial regimen documented in antibiotic time-out.

Table 1. Antibiotic time-out performance on participating pediatric services.

	General Pediatrics (2 teams)	PICU (1 team)	Total
Total participating weeks	145	50	195
Eligible patients (n)	247	106	353
Antibiotic time-outs (% of eligible)	237 (96%)	105 (99.1%)	342 (96.9%)
Time-outs within target window (% of time outs)	194 (81.9%)	72 (68.6%)	266 (77.8%)
Time-outs leading to de-escalation (% of time-outs)	33 (13.9%)	3 (2.9%)	36 (10.5%)
Any plan change documented (% of time-outs)	45 (19%)	8 (7.6%)	53 (15.5%)
Plan changes executed within 24 hours of time-out (% of time-outs with plan change documented)	40 (88.9%)	6 (75%)	46 (86.8%)

Conclusion. This project demonstrates that ABTOs can be implemented across a variety of teams and showed successful spread of an adult-based QI project to pediatrics. ABTOs led to clear de-escalation in 10.5% of cases, with other changes made in 5% of cases. Future directions include continued spread to inpatient teams, development of EMR-based ABTO alerts, comparison of overall antibiotic use and adverse events before and after ABTO implementation, and characterization of antimicrobial optimization prior to ABTO.

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

1132. Evaluating an Amoxicillin Dosing Regimen for Community Acquired Pneumonia: A Quality Improvement Initiative Using Clinical and Laboratory Data

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Session: P-63. Pediatric Antimicrobial Stewardship (inpatient/outpatient pediatric focused)

Background. Amoxicillin 90 mg/kg/day divided twice daily is recommended for children with mild community acquired pneumonia (CAP). While adequate for fully susceptible *Streptococcus pneumoniae* isolates, three times daily dosing allows achievement of greater amoxicillin exposure, which may be necessary for isolates with penicillin minimum inhibitory concentrations (MIC) of ≥ 2 µg/mL. We evaluated our current twice daily amoxicillin dosing strategy by characterizing 1) the MIC distribution among *S. pneumoniae* isolates and 2) the frequency of clinical amoxicillin treatment failures.

Methods. We performed a retrospective cohort study of all *S. pneumoniae* isolates from sterile and non-sterile sites between 2017-2020. Breakpoints established by the CLSI were used for both meningitis and non-meningitis isolates. Only the first isolate per patient was included. We also evaluated the frequency of amoxicillin treatment failure in patients diagnosed with CAP who were discharged from the ED in 2019. CAP was defined as a discharge diagnosis code for pneumonia and an antibiotic prescription. Treatment failure was defined as an ED or primary care revisit, or admission, within 14 days during which an antibiotic change was made.

Results. 28 *S. pneumoniae* isolates were identified from sterile sites between 2017-2020 and 171 isolates were identified overall. All isolates from sterile sites had penicillin MICs of ≤ 2 µg/mL and 165 (96%) of isolates overall had penicillin MICs of ≤ 2 µg/mL (Table 1). Of these, 10 isolates had MICs of 2 µg/mL, all from non-sterile sites. In 2019, 589 patients were treated for CAP in the ED; 447 (76%) received amoxicillin and 142 (24%) were treated with alternative antibiotics. Treatment failures occurred in 15 amoxicillin-treated patients (3.3%, 95% confidence interval 1.9-5.5%) and in 5 patients (3.5%, 95% confidence interval 1.2-8.0%) treated with alternative antibiotics.

Table 1. Antibiotic susceptibilities of *S. pneumoniae* isolates

	Sterile site (N=28)			All isolates (N=171)		
Antibiotic	Sensitive N(%)	Intermediate N(%)	Resistant N(%)	Sensitive N(%)	Intermediate N(%)	Resistant N(%)
Penicillin	100 (100)	0 (0)	0 (0)	165 (96)	4 (2)	2 (1)
Vancomycin	100 (100)	0 (0)	0 (0)	171 (100)	0 (0)	0 (0)
Ceftriaxone	100 (100)	0 (0)	0 (0)	170 (99)	1 (<1)	0 (0)
TMP-SMX	20 (71)	5 (22)	3 (13)	142 (83)	16 (9)	13 (8)

TMP-SMX, trimethoprim-sulfamethoxazole

Conclusion. *In vitro* penicillin resistance was rare at our institution. Further, given that *S. pneumoniae* is rarely identified by culture, we also demonstrated that clinical amoxicillin treatment failures were infrequent using twice daily amoxicillin dosing. Coupled with provider and family preference, these data supported continuing our current practice of twice daily amoxicillin dosing.

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1133. Opportunities for Antibiotic Discontinuation and De-escalation after Discharge from the Emergency Department in Pediatric Patients with UTI

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Session: P-63. Pediatric Antimicrobial Stewardship (inpatient/outpatient pediatric focused)

Background. In children, urinary tract infection (UTI) represents one of the most common indications for antibiotics. While previous data has demonstrated high rates of misdiagnosis and inconsistencies with empiric antibiotics, the impact and opportunities for antibiotic reduction once final culture and susceptibility data are available, particularly in pediatric patients seen in the emergency department (ED), is unknown.

Methods. This was a retrospective study conducted over a period of 18-months, which included subjects less than 18 years of age who were discharged from the ED with a diagnosis of UTI. Episodes in which urine cultures were negative or grew only mixed urogenital flora were considered possible for discontinuation. De-escalation was considered possible in episodes in which identified bacteria were susceptible to more narrow spectrum agents than the prescribed empiric antibiotic. Rates of discontinuation and de-escalation were calculated as proportions, and excess days of therapy were described. Subjects whose empiric antibiotics were active against isolated bacteria were compared to those with bacteria resistant to empiric therapy.

Results. A total of 87 episodes of UTI were identified. Pathogenic bacteria were isolated in 51 (59%) of the 78 episodes in which urine cultures were sent, most commonly *Escherichia coli* (84%). Empiric antibiotic therapy and duration varied and were active against isolated bacteria in 39 (76%) of the episodes. Subjects whose antibiotics were inactive were more likely to be Hispanic and receive cephalexin [Table 3]. Antibiotics were discontinued in 3 of the 27 possible episodes (11%), resulting in 127 extra antibiotic days, median of 6 (IQR=10 days) days per episode. In 20 episodes there was an opportunity for de-escalation, but it was never attempted, leading to 131 extra days of broad-spectrum antibiotics (median 7.5 days, IQR=3).

Table 1. Microbiology and resistance profile of bacteria isolated from urine cultures

Organism	n (%)	Cefazolin susceptibilities (%)		
		Susceptible	Intermediate	Resistant
Totals	51	59.6	23.1	17.3
Escherichia coli	43 (84)	62.8	27.9	9.3
Others*	8 (16)	37.5	--	62.5

Enterobacter aerogenes (2), Klebsiella pneumonia, Salmonella species, Citrobacter freundii, Proteus mirabilis, Stenotrophomonas maltophilia, Pseudomonas aeruginosa

Table 2. Empiric antibiotic regimens, including type of antibiotic and duration

Antibiotic	Number of prescriptions n (%) [N=87]	Median duration, days (IQR)
3rd generation cephalosporin	37 (42.5)	10 (3)
Cephalexin	29 (33.3)	7 (3)
Trimethoprim/sulfamethoxazole	9 (10.3)	7 (5)
Amoxicillin-clavulanate	5 (5.7)	7 (3)
Nitrofurantoin	4 (4.6)	7 (2)
Amoxicillin	2 (2.3)	8.5 (3)
Fluoroquinolones	1 (1.2)	7

Table 3. Comparison of episodes in which empiric antibiotics were active against isolated bacteria versus those in which empiric antibiotics were inactive

	Active (n=39)	Inactive (n=12)	p-value
Age, years, median (IQR)	8.2 (13)	2.2 (9)	0.07
Sex, female, n (%)	35 (89.7)	11 (91.7)	0.8
Race, white, n (%)	27 (69.2)	4 (33.3)	0.04
Ethnicity, n (%)			0.02
Hispanic	4 (10.3)	5 (41.7)	
Non-Hispanic	34 (87.2)	6 (50.0)	
Unknown	1 (2.6)	1 (8.3)	
Underlying comorbidities, n (%)	12 (30.8)	3 (25.0)	0.3
Prior UTI, n (%)	18 (46.1)	4 (33.3)	0.4
Empiric antibiotic cephalexin, n (%)	10 (25.6)	7 (58.3)	0.04
Duration of empiric antibiotics, n (%)	10 (3)	8.5 (3)	0.2
Complications, n (%)	5 (12.8)	0 (0)	0.3

Conclusion. Antibiotics are rarely adjusted after discharge from the ED. Lack of adjustment results in unnecessary total and broad-spectrum antibiotic exposures. Initiatives designed to improve antibiotic use post-discharge could result in significant decreases in unnecessary antibiotics, and ultimately reduced rates of antibiotic resistance.

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1134. The Effect of Telehealth Antimicrobial Stewardship Program on Antimicrobial Use in a Pediatric Intensive Care Unit

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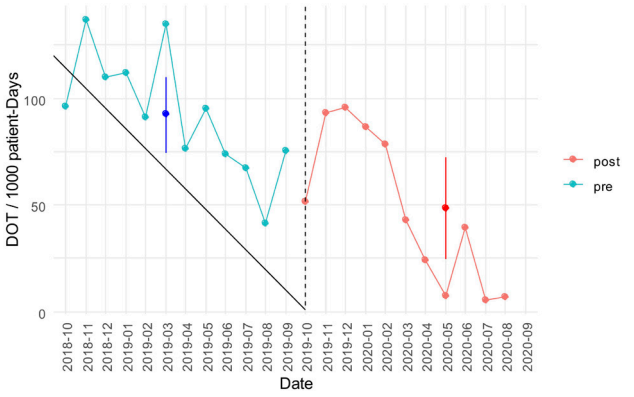
Session: P-63. Pediatric Antimicrobial Stewardship (inpatient/outpatient pediatric focused)

Background. Inappropriate antimicrobial use is common in pediatric intensive care units (PICU). We aimed to evaluate the effect of telehealth antimicrobial stewardship program (ASP) on the rate of PICU antimicrobial use in a center without a local infectious diseases consultation service.

Methods. Aretrospective cohort study was performed between October 1st, 2018 and October 31st, 2020 in Farwaniyah Hospital PICU, a 20-bed unit. All pediatric patients who were admitted to PICU and received systemic antimicrobials during the study period were included and followed until hospital discharge. Patients admitted to the PICU prior to the study period but still receiving intensive care during the study period were excluded. Weekly prospective audit and feedback on antimicrobial use was provided starting October 8th, 2019 (post-ASP period) by the ASP team. A pediatric infectious diseases specialist would join ASP rounds remotely. Descriptive analyses and a pre-post intervention comparison of days of therapy (DOT) were used to assess the effectiveness of the ASP intervention

Results. There were 272 and 152 PICU admissions before and after initiation of ASP, respectively. Bronchiolitis and pneumonia were the most common admission diagnoses, together compromising 60.7% and 61.2% pre- and post-ASP. Requirement for respiratory support was higher post-ASP (76.5% vs 91.5%, p< 0.001). Average monthly antimicrobial use decreased from 92.2 (95% CI 74.5 to 100) to 48.5 DOT/1,000 patient-days (95% CI 24.6 to 72.2, P < 0.05) (figure). A decline in DOT was observed across all antibiotic classes, except for ceftriaxone and clarithromycin. No effect on length of PICU stay, hospital length of stay, or mortality was observed. Most (89.7%) ASP recommendations were followed fully or partially changes in antimicrobial days of therapy (DOT)/1,000 patient-days over time. The dashed line represents the start of the antimicrobial stewardship program (ASP)



Conclusion. In settings where infectious diseases services are not available, telehealth stewardship can be effectively implemented and associated with a significant reduction of antimicrobial use.

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1135. The Effect of Penicillin Allergy Labels on Antibiotic Prescribing for Children Diagnosed with Upper Respiratory Tract Infections in Two Primary Care Networks

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Session: P-63. Pediatric Antimicrobial Stewardship (inpatient/outpatient pediatric focused)

Background. In pediatric inpatient settings, unconfirmed penicillin allergy labels (PALs) are associated with increased broad-spectrum antibiotic use, costs, and adverse events. However, 90% of antibiotics are prescribed in the outpatient setting and 70% of these antibiotics are given for upper respiratory tract infections (URTI.) Little is known about the effect of PALs on antibiotic prescribing in the pediatric outpatient population.

Methods. A retrospective birth cohort was created of children born between January 1st 2010 and June 30th 2020 and seen at one of 91 Texas Children's Pediatrics or Children's Hospital of Philadelphia primary care clinics. Children with an ICD10 code for an URTI and an antibiotic prescription were stratified into those with or without a penicillin allergy label at the time of the infection. Rates of second-line and broad-spectrum antibiotic use were compared.

Results. The birth cohort included 334,465 children followed for 1.2 million person-years. An antibiotic was prescribed for 696,782 URTIs and the most common diagnosis was acute otitis media. Children with PALs were significantly more likely to receive second-line antibiotics (OR 35.0, 95% CI 33.9-36.1) and broad-spectrum antibiotics (OR 23.9, 95% CI 23.2-24.8.) Children with PALs received more third generation cephalosporins (60% vs. 15%) and more macrolide antibiotics (25% vs. 3%) than those without a PAL. Overall, 18,015 children (5.4%) acquired a PAL during the study period, which accounted for 23% of all second-line antibiotic prescriptions and 17% of all broad-spectrum antibiotic use for URTIs.