

POSTER ABSTRACT

169. Targets for Optimizing Oral Antibiotic Prescriptions for Pediatric Outpatients in Japan

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Session: 49. Antimicrobial Stewardship: Interventions in Pediatric Populations
 Thursday, October 4, 2018: 12:30 PM

Background. In Japan, 92% of antibiotics consumed are oral agents most of which are prescribed at outpatient clinics. Universal health insurance and the full reimbursement program for children enables to patients to be treated and obtain prescriptions without any charge in the majority of institutions. Thus, it is possible that unnecessary antibiotic prescription for viral illnesses is common due to free medical access in Japan. As part of a national project to formulate an effective method of antimicrobial stewardship for pediatric outpatients, the aim of our study was to identify key targets for optimizing oral antibiotic use in children by analyzing what factors are related to their prescription in three pilot districts.

Methods. We analyzed data on oral antimicrobial prescription patterns for children aged <16 years in three districts (Setagaya ward, Fuchu city, and Kobe city) using national database in Japan. Oral prescriptions were categorized according to their class, spectrum, clinic specialization, and type of clinical setting. The antibiotic spectrum was categorized as narrow, broad, or ultra-broad.

Results. In total 13,869,332 antibiotic prescriptions were collected for analysis. The proportions of narrow, broad, and ultra-broad spectrum antibiotics were 12.4%, 73.3%, and 14.2%, respectively. The proportions of narrow and ultra-broad spectrum antibiotics were 10.8% and 15.4% in primary care clinics and 23.4% and 5.4% in hospital, respectively. Otolaryngologists prescribed the most antibiotics to children at a rate 1.3 times higher than pediatricians (Figure 1). Dermatologists prescribed 58.7% of all tetracyclines (Figure 2). Three classes of third-generation cephalosporins, quinolones, and penems were prescribed mostly by pediatricians and otolaryngologists.

Conclusion. Ultra-broad spectrum antibiotics were prescribed more often in primary care clinics. As the use of specific oral antibiotics differ according to the specialty of each clinic, targeting the clinics specialty and the antibiotic agents used may be key to optimizing oral antibiotic use for pediatric outpatients.

Figure 1: Day of therapy in the hospitals and clinics

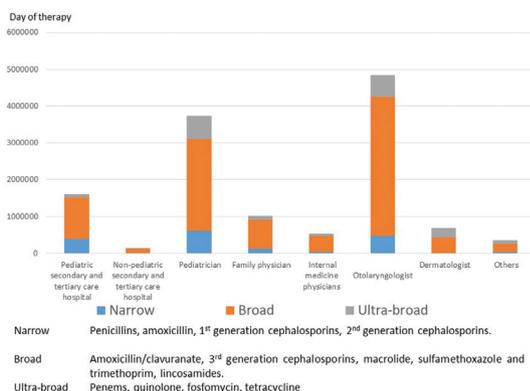
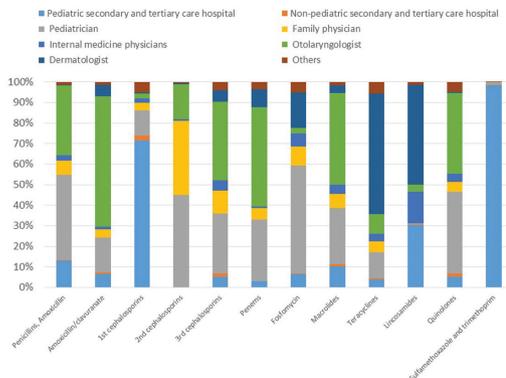


Figure 2: Ratio of clinics and hospitals in each type of antibiotics.

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170. Characterization of Appropriate Antibiotic Prescribing for Pediatric Respiratory Tract Infections: Setting the Stage for Stewardship

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Session: 49. Antimicrobial Stewardship: Interventions in Pediatric Populations
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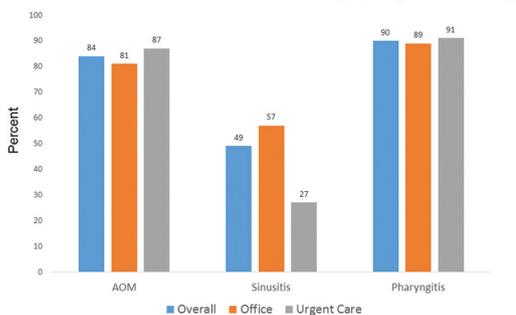
Background. Inappropriate antibiotic use includes prescribing for antibiotic inappropriate diagnoses and use of broad-spectrum instead of narrow-spectrum therapies and contributes to adverse events and antibiotic resistance. To guide the design and implementation of antibiotic stewardship interventions in a network of pediatric clinics, we sought to characterize appropriate antibiotic prescribing for children diagnosed with uncomplicated respiratory infections.

Methods. Retrospective cohort study of visits by children to one of 31 primary care or six urgent care clinics in a university healthcare system between January 1, 2016 and December 31, 2017. Two outcomes were used to characterize antibiotic prescribing: (1) percentage of antibiotic inappropriate diagnoses (bronchitis, bronchiolitis, upper respiratory infection) that were prescribed an antibiotic; (2) percentage of visits with a diagnosis for acute otitis media (AOM), sinusitis, or pharyngitis prescribed first-line recommended antibiotics (amoxicillin or penicillin). Children with a documented penicillin allergy or antibiotic prescriptions in the previous 30 days were excluded. Chi-square tests were used to compare prescribing between settings.

Results. Among 117,279 total visits examined, 16,760 (14%) were for antibiotic inappropriate diagnoses, 5,912 (5%) for AOM, 844 (1%) for sinusitis and 4,912 (4%) for pharyngitis. Only 3% (95% CI: 2.9-3.4) of antibiotic inappropriate diagnoses were prescribed antibiotics. The percent of visits for AOM, sinusitis, and pharyngitis prescribed first-line antibiotics ranged from 27% (95% CI: 21-33) for sinusitis in urgent care to 91% (95% CI: 90-92) for pharyngitis in urgent care (figure). Differences in appropriate prescribing by setting were observed for AOM ($P < 0.01$) and sinusitis ($P < 0.01$).

Conclusion. In this network of pediatric practices, we found minimal evidence of unnecessary antibiotic use for respiratory infections but substantial underuse of first-line therapy for sinusitis, especially in urgent care settings. Stewardship interventions designed to reinforce existing practices for antibiotic-inappropriate conditions and promote greater use of appropriate first-line therapies are planned for this setting.

Percent Prescribed Recommended First-Line Therapy by Diagnosis and Setting



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171. Impact of Limiting Antimicrobial Indication Options in a Pediatric Electronic Health Record

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Session: 49. Antimicrobial Stewardship: Interventions in Pediatric Populations
Thursday, October 4, 2018: 12:30 PM

Background. In April 2005, our Antimicrobial Stewardship Program (ASP) started to require prescribers to select an indication as part of an antimicrobial (AM) order. The ASP developed a list of approved indications for each AM with an unlimited number of options including "other." In 2015–2016, we modified the indication lists to decrease the number of options. The goal of this project is to compare the frequency of indication "other" and the appropriateness of provider-selected indications before and after the intervention.

Methods. We performed a retrospective cohort study of cefepime, ceftriaxone, piperacillin/tazobactam, and ciprofloxacin (IV) orders for all children in our facility excluding orders placed in ambulatory locations and the emergency department. AM orders and provider-selected indications from January to March 2014 (preintervention) and 2017 (postintervention) were compared. Chart review was performed on a sample of pre- and postmodification orders to assess the appropriateness of provider-selected indications. An indication was considered appropriate if the provider-selected indication matched the clinical indication documented.

Results. A total of 747 orders were included in the data analysis, 350 and 397 orders from pre- and postintervention period, respectively. Ceftriaxone was the most commonly prescribed AM:13.7 and 17.2 orders per 1,000 inpatients-days during pre- and postintervention periods. The percent of indication "other" orders increased in the postintervention period for ceftriaxone while it decreased for ciprofloxacin and remained about the same for cefepime and piperacillin/tazobactam. Most prescribers who selected indication "other" for ceftriaxone during the postintervention period did not provide a reason (29.8%). The agreement between clinical and provider-selected indications was consistent in pre- and postintervention period except piperacillin/tazobactam (RR = 0.56).

Conclusion. Requiring selection of an indication encourages prescribers to evaluate their rationale for initiating an AM. Decreasing the number of indication options for some AMs was associated with increased use of indication "other," suggesting that the prescriber could not find an indication that matched their needs.

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172. Antimicrobial Stewardship in High-risk Pediatric Patients

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Session: 49. Antimicrobial Stewardship: Interventions in Pediatric Populations
Thursday, October 4, 2018: 12:30 PM

Background. The clinical impact of antimicrobial stewardship programs (ASP) on children admitted to the intensive care units (ICU) or oncology wards is unknown. The objective of this study was to determine whether following ASP recommendations improved clinical outcomes in pediatric ICU and oncology patients.

Methods. We performed a retrospective cohort study to evaluate the relationship between ASP recommendation(s) agreement and patient outcomes (hospital length of stay [LOS], 30-day mortality, hospital readmission within 30 days, and hospital-onset *Clostridium difficile* infection [HO-CDI]) in a high-risk (HR) population. For this study, we included all children admitted to the neonatal ICU (NICU), pediatric ICU (PICU), or oncology (Onc) ward from March 2008 to March 2017 who underwent an ASP review. Unadjusted differences in LOS, mortality, readmissions, and HO-CDI were compared between cases of ASP agreement and disagreement. Generalized linear mixed models were used to control for potential confounders and account for patients with >1 ASP review.

Results. ASP performed 11,545 antimicrobial reviews (PICU 3,628; NICU 2,824; Onc 5,093) on 7,329 unique patients. ASP provided 2,088 recommendations. Stop antibiotics was the most common recommendation ($N = 1,045$; 50%) followed by narrow antibiotics ($N = 474$; 23%), and obtain an infectious disease consultation ($N = 334$; 16%). Agreement with ASP by the prescribing clinician occurred in 70% of cases. Overall, 356 (5%) patients died, 87 (1%) had HO-CDI, and 2,608 (36%) were readmitted. Agreeing with an ASP recommendation was not associated with increased odds of mortality or readmission. Agreement with an ASP recommendation was not associated with decreased odds of acquiring HO-CDI (adjusted OR 1.58, 95% CI: 0.35, 7.26). Among HR patients with a single ASP review, the median LOS was significantly shorter for clinicians who agreed with recommendations vs. disagreed (10.3 days vs. 12.5 days, respectively, $P = 0.02$).

Conclusion. Agreement with an ASP recommendation was associated with a shorter LOS and no increase in readmissions or mortality. Further stewardship strategies are needed to optimize antimicrobial use in this HR pediatric population.

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173. Nationwide Outpatient Oral Antimicrobial Utilization by Children in Japan

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Session: 49. Antimicrobial Stewardship: Interventions in Pediatric Populations
Thursday, October 4, 2018: 12:30 PM

Background. Antimicrobial resistance (AMR) is a major public health concern across the world. Japanese government set goals in national AMR action plan to reduce oral cephalosporins, macrolides, and quinolones into a half of the 2013 use by 2020. We evaluated the nationwide antimicrobial use (AMU) of children in Japan using the dispensed receiptive from the national administrative database in regard to the national AMR action plan.

Methods. The national health claims database was interrogated for oral antibiotics dispensed from outpatient pharmacies in Japan to children under 15 years of age from January 2013 to December 2016. Information obtained from each prescription included age, residence area, days of therapy (DOT) for each antimicrobial from dispensing receiptive. DOT was corrected by the resident population in area and calculated as DOT/1,000 pediatric inhabitants/day (DOT/PID). Chi-squared test for trend was performed to evaluate the annual changes of DOT/PID.

Results. A total of 1,386,932 oral antibiotic prescriptions were identified during 2013–2016. Total amount of antimicrobial used in children did not change (2013: 28.54 DOT/PID, 2016: 28.70 DOT/PID, $P_{\text{trend}} = 0.25$). No statistically significant changes were observed in prescriptions of third-generation cephalosporins (2013:10.21DOT/PID, 2016:9.87DOT/PID, $P_{\text{trend}} = 0.50$), macrolide (2013:11.04 DOTID, 2016:10.72 DOT/PID, $P_{\text{trend}} = 0.52$), and quinolone (2013:1.46DOT/PID, 2016:1.86DOT aged <5 years compared with older infants, with the highest rate among children aged 1 year. Targeted antimicrobials for AMR action plan showed similar distribution by age (Figure 2).

Conclusion. Interim assessment of the national AMR action plan revealed that the goals were not attainable without significant interventions in children by 2020. Overall antibiotic prescription as well as cephalosporins, macrolides, and quinolones prescription were most prevalent in children aged 1 year. Antimicrobial stewardship targeting infants and younger children is necessary.

Figure 1: Trends of pediatric outpatient total oral antimicrobial use stratified from 2013 to 2016

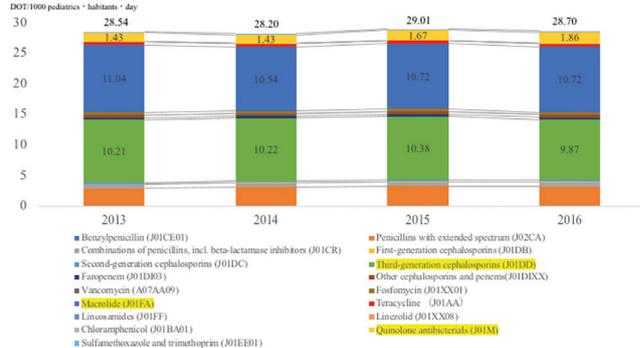
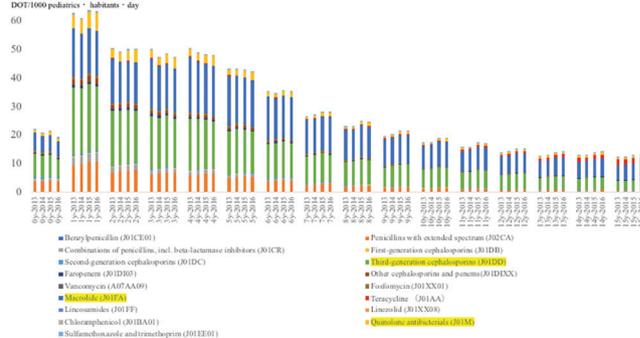


Figure 2: Trends of pediatric outpatient total oral antimicrobial use by age stratified from 2013 to 2016



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174. Treatment of Tracheitis and Antimicrobial Stewardship Interventions

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