

Antibiotic Prescribing for Pediatric Community-Acquired Pneumonia at Children's Hospitals and General Hospitals Following National Guideline Release



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Background

- 2011 IDSA/PIDS guidelines for pediatric community-acquired pneumonia (CAP) recommend penicillin, amoxicillin, or ampicillin (penicillins) as first-line therapy for most children.
- Use of penicillins increased at children's hospitals following guideline publication.
- Trends in antibiotic selection for pediatric CAP at general hospitals have not been evaluated.

Objectives

- Evaluate trends in antibiotic prescribing for pediatric CAP at general hospitals
- Compare trends at general hospitals with those at children's hospitals

Methods

- Retrospective analysis of children 1-17 years admitted from January 2009 through September 2015
- Analysis included 522 hospitals, captured via the Pediatric Health Information System and Premier Perspective databases.
- Children with CAP were identified via a validated ICD-9 code algorithm, excluding those with complicated pneumonia, complex chronic conditions, receipt of intensive care, or MRSA infection or colonization.
- Receipt of penicillins, cephalosporins, and macrolides was assessed.
- Trends were modeled using segmented logistic regression, adjusting for age, sex, and insurance payer.
- Standardized probability of receipt of select drugs in the final study year (October 2014 – September 2015) was modeled with logistic regression.
- Analyses were performed with Stata v13.1 (Stata Corp., College Station, TX).

Results

- Of 120,238 children hospitalized with CAP, 54% were admitted to 51 children's hospitals. Patient age was similar between hospital types; a greater proportion of patients at general hospitals were male and received insurance through Medicaid (Table 1).
- After adjustment, penicillin use increased following guideline release in both children's hospitals (p for trend = 0.001) and general hospitals (p for trend = 0.005; Figure 1).
- After adjustment, cephalosporin use decreased following guideline release in both children's hospitals (p for level = 0.028) and general hospitals (p for trend = 0.007; Figure 2).
- After adjustment, macrolide use decreased following guideline release in both children's hospitals (p for trend < 0.001) and general hospitals (p for trend < 0.001; Figure 3).
- In the final year of the study, children in general hospitals were less likely to receive penicillins (standardized probability 0.23 vs. 0.57) and more likely to receive cephalosporins (0.78 vs. 0.51) and macrolides (0.43 vs. 0.28) than children in children's hospitals (p < 0.001 for all comparisons, Figure 4).

Figure 1: Standardized Probability of Receiving Penicillins for CAP

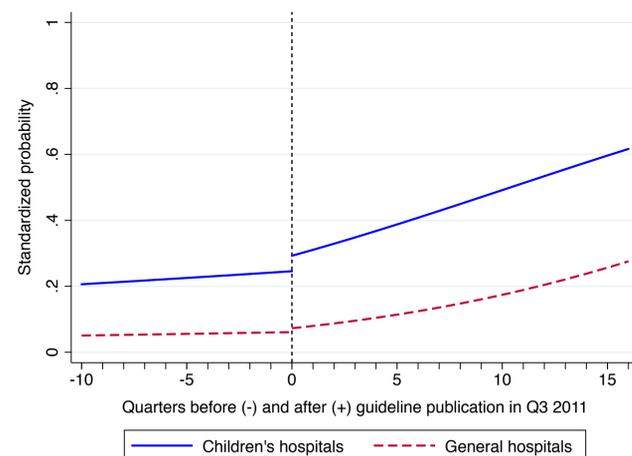


Figure 2: Standardized Probability of Receiving Cephalosporins for CAP

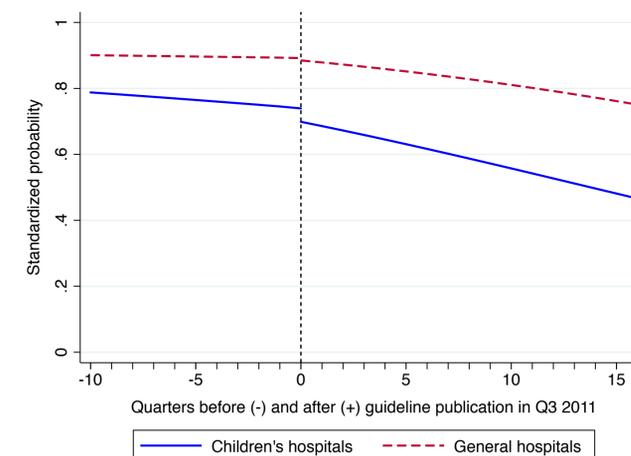


Figure 3: Standardized Probability of Receiving Macrolides for CAP

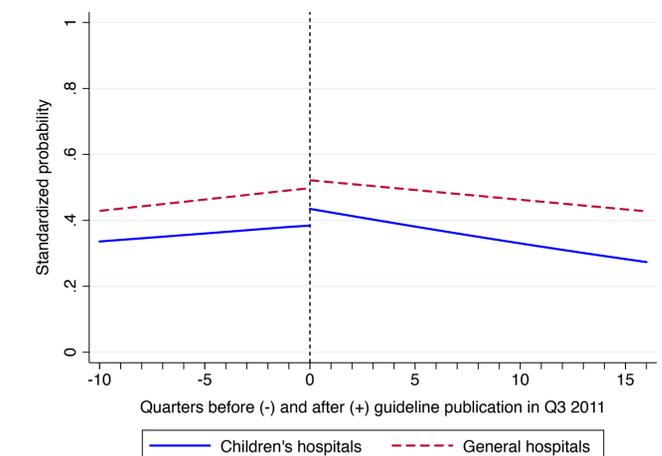
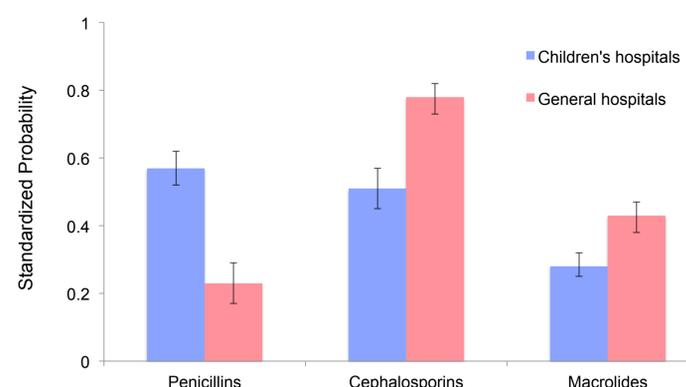


Table 1: Characteristics of Children with CAP

Characteristic [†]	Hospitalized at Children's Hospitals (n = 65,209)	Hospitalized at General Hospitals (n = 55,029)
Age (years)	3 (1, 6)	3 (1, 6)
Age group		
1-4 years	42,189 (65)	35,319 (64)
5-11 years	19,067 (29)	15,828 (29)
12-17 years	3,953 (6)	3,882 (7)
Male sex*	33,353 (51)	29,570 (54)
Insurance payer*		
Medicaid	35,566 (55)	31,139 (57)
Private/Other	28,860 (45)	23,890 (43)

[†]Summarized as median (interquartile range) or n (%) as appropriate
^{*} p < 0.05 on bivariate analysis

Figure 4: Standardized Probability of Receiving Select Antibiotics for CAP, October 2014 – September 2015



p < 0.001 for all comparisons
 Error bars represent 95% confidence intervals

Conclusions

- Publication of national guidelines was associated with increased guideline-concordant antibiotic selection for pediatric CAP at both children's and general hospitals.
- Despite these improvements, significant disparities in prescribing for pediatric CAP persist between children's and general hospitals.