

Antibiotic Utilization for Pneumonia and other Respiratory Infections in Primary Care Offices, Urgent Care Centers, and a Pediatric Emergency Department



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Background

Pneumonia (PNA) and other respiratory infections are common diagnoses in outpatient pediatrics and often result in antibiotic utilization. Pediatric Infectious Diseases Society (PIDS) and the Infectious Diseases Society of America (IDSA) guidelines published in 2011 recommend narrow-spectrum agents, namely amoxicillin/ampicillin, as empiric therapy for the majority of community-acquired pneumonia. In most respiratory infections other than PNA, antibiotics are not indicated.

Despite the PNA guidelines, studies available shortly after their availability indicated variable and incomplete adherence in both inpatient and outpatient settings.^{2,3} Also, a large scale administrative database review of a decade ago demonstrated that antibiotic prescriptions for presumed non-bacterial upper respiratory conditions is common, and occur in >10 million visits/year.⁴

Aim

To assess current adherence to antibiotic recommendations in PIDS/IDSA Pneumonia guidelines, and antibiotic utilization for other respiratory conditions, amongst pediatric providers in distinct academic-affiliated and private outpatient settings.

Methods

Secondary analysis of a large outpatient sepsis point prevalence study, all patients 0 to 18 years of age were screened for sepsis 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, on 9/5/16, 12/5/16, 3/6/17, and 6/5/17.

- For this analysis, all children given a provider diagnosis of pneumonia, upper respiratory infection (URI), bronchitis, and bronchiolitis were identified, and antibiotic prescription data were collected.
- Cases primarily labelled with all other diagnoses were excluded.
- Adherence to PIDS/IDSA pneumonia guidelines, and antibiotic utilization for all other (above) captured cases, were analyzed relative to clinical care setting.

Results

- A higher proportion of UCC visits, 4.8%, and ED visits, 7.5% were for PNA, vs. PMD, 0.9% ($p < 0.01$)
- When antibiotics given in PMD and UCC, azithromycin used in >50% of cases
- In ED, when parenteral antibiotics given, 58% ceftriaxone vs. 35% ampicillin
- At no specific site, or separating cases by oral or parenteral agents, was recommended 1st line antibiotic use >50%

Table 1: Pneumonia Diagnosis and Antibiotics by Outpatient Site

	PMD	UCC	ED	All Sites
Sick Visits	932	270	945	2047
PNA (total #)	0.9% (8)	4.8%* (13)	7.5%# (71)	4.5% (92)
Antibiotics given	62.5%	53.8%	40.8%	44.6%
&Amoxicillin	20%	28.6%	13.8%	17.1%
Ampicillin	0	0	20.7%	4.9%
Ceftriaxone	0	14.3%	34.5%	26.8%
Azithromycin	60%	42.9%	0	40%
Amoxicillin Clavulanate	20%	14.3%	0	4.9%
Ampicillin/sulbactam	0	0	3.5%	2.4%
[§] Recommended 1 st line agent	20%	28.6%	34.5%	31.7%

* $p < 0.01$ for Difference between PMD and UCC

$p < 0.01$ for Difference between PMD and ED

§Percentage of all antibiotics given (per site or total)

[§]1st line per guidelines Amoxicillin or Ampicillin

Table 2: URI, bronchitis, bronchiolitis diagnoses, and antibiotics given for URI by site

	PMD	UCC	ED	All Sites
Sick Visits	932	270	945	2047
URI	11.8%	17.8%*	14.1%	14.2%
Bronchitis	0	0.7%	1.4%	0.7%
Bronchiolitis	0.9%	1.9%	5.0%#*	2.9%
Total	12.7%	20.4%	20.4%	17.9%
Antibiotics given for URI	14.5% (16/110)	31.3%* (15/48)	31.6%# (42/133)	25.1% (73/291)

* $p < 0.01$ for Difference between PMD and UCC

$p < 0.01$ for Difference between PMD and ED

^ $p < 0.01$ for Difference between UCC and ED

- 17.8% of all UCC visits were for URI, a higher proportion than in PMD offices
- 5% of all ED visits were for bronchiolitis, a higher proportion than PMD and UCC
- 21.7% (13/60) of all bronchiolitis cases were given a co-dx of Otitis Media and prescribed antibiotics
- >31% of cases given a primary diagnosis of URI in UCC and ED were given antibiotics (vs. 14.5% in PMD)

Limitations

- As a retrospective medical record based study, several limitations are inherent. The dataset itself is limited by the lack of a standard means of documentation, leaving third-party interpretation subject to site and individual biases.
- Unable to analyze more subtle factors that influence decisions around antibiotics for PNA, such as immunization status, illness duration, presenting respiratory and clinical acuity, and radiologic findings, which were not captured
- Determining the likelihood of a co-infection warranting antibiotics with URI and bronchiolitis cases is challenged

Conclusions

1. Despite availability of professional society guidelines for several years, utilization of recommended, narrow spectrum agents for PNA remains low. This includes continued preference of ceftriaxone over ampicillin for empiric therapy in an academically-affiliated ED.
2. Azithromycin is frequently selected for PNA treatment in PMD offices and UCC
3. Antibiotic prescribing for cases primarily assessed as respiratory conditions in which antibiotics are not warranted remains substantial across outpatient settings. For URI in UCC and ED, the rates are >30%.
4. Renewed stewardship attention for PNA, especially in outpatient settings which may have not yet undertaken local efforts, could be an important pediatric target.
5. Similarly, efforts should be enhanced around antibiotic stewardship for primary non-bacterial conditions, especially in private urgent care centers which represents a growing sector of outpatient visits⁵ and URI presentations.

References

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