



The Cost and Potential Avoidability of Antibiotic-Associated Adverse Drug Reactions

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Introduction

- An adverse drug reaction (ADR) is a response to a medicine which is noxious and unintended occurring with the normal drug dose.
- ADRs result in significant health care utilization. An estimated 450,000 pediatric outpatient and 130,000 Emergency Department visits are attributed to undesired drug reactions that occur in the U.S. yearly.
- Antimicrobials are the most common cause of pediatric ADRs.
- Little data is available describing the indications for which an implicated medication was prescribed to a child and whether or not an ADR was potentially avoidable.
- The economic burden of ADRs in the pediatric inpatient setting is known to be significant, but little is known about the additional cost associated with ADRs presenting to the ED and UC setting.

Objectives

- The primary objective was to characterize the scope and burden of pediatric ADRs resulting in a visit to the Emergency Department (ED) or Urgent Care (UC).
- The secondary objective was to determine the associated cost and potential avoidability of antibiotic associated ADRs.

Methods

- Retrospective chart review of patients diagnosed with an ADR in the Children's Mercy Hospital (CMH) ED or UC setting between July 1, 2013 - June 30, 2014.
- Patients were identified by the CMH Drug Safety Service which is an active pharmacovigilance program.
- The following data were extracted from the EMR: visit date, patient race/age, implicated medication, ADR symptoms/severity/type, days of medication exposure, medication indication, ADR treatment, ADR EMR documentation at the visit, subsequent medication prescribed or discontinued, disposition following ED/UC visit, charge of ADR visit, and 30 day recurrent ED/UC visit.
- Descriptive statistics were used for analysis.
- This study had institutional review board approval.

Table 1. ADR Type and Severity Classification

Allergy/Hypersensitivity	Immune or other mechanism unique to the patient (rash, hives, anaphylaxis)
Side Effect	Undesirable response due to pharmacologic properties of drug
Precaution	Caution is needed due to disease or interactions unique to patient
Religious/Preference	Patient/family wishes to avoid use of medication
Unknown	Unable to determine
ADR Severity Classification	
Mild	Drug can be continued without any treatment
Moderate	Drug was changed or stopped; Reaction required treatment
Severe	Reaction caused hospital admission, permanent disability, delayed discharge or was life threatening
Unknown	Unable to illicit history from caregiver

Results

Table 2. Demographics and ADR Severity

- A total of 430 children were identified as being seen in the ED or UC for an active ADR.

Age (Years)	Median age 3.1 (IQR 0.1-18.8)
Race/Ethnicity (%)	White 60.90% African American 14.40% Latino 12.80% Other 11.90%
Visit Location (%)	Emergency Department 62.60% Urgency care 37.40%
ADR Severity (%)	Mild 0.70% Moderate 89.10% Severe 4.20% Unknown 6.00%

Table 3. Indication of Implicated Medication

Reason for prescribing	No. of patients (%)
N=430	
Antimicrobials	361 (84)
Otitis Media	182 (42)
SSTI	66 (15)
Pharyngitis	40 (9)
Pneumonia	22 (5)
Sinusitis	14 (3)
UTI	9 (2)
Bronchitis/Wheeze	10 (2)
Conjunctivitis	1 (0.2)
Bacteremia	1 (0.2)
Viral	16 (4)
Pain	4 (1)
Behavioral	13 (3)
CNS	12 (3)
Prophylaxis	5 (1)
Antipyretic	1 (0.2)
Supplement	1 (0.2)
2+	21 (5)
Other/Unknown	12 (3)

- 361 cases (84.00%) of medications resulting in an ED or UC ADR visit were antibiotics.
- The most common clinical symptoms associated: rash (93.70%), angioedema (11.90%), GI symptoms (8.40%), difficulty breathing (2.60%), and serum sickness (2.60%).

Figure 1. ADR Cost Burden

- A total of 430 pediatric ED and UC visits due to ADRs resulted in total charges of **\$432,388.68**.

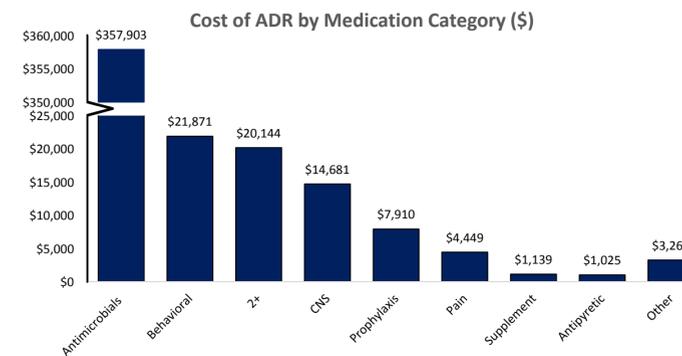
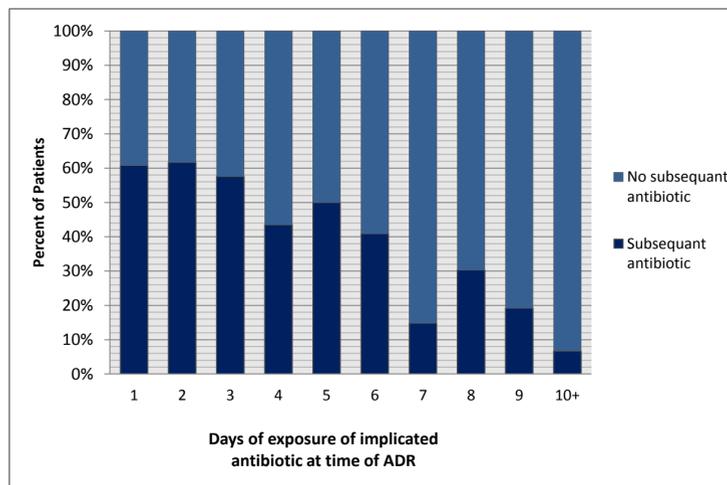


Figure 2. ADR Avoidability



- 65.20% of the 361 children who presented with an antibiotic-associated ADR were not prescribed additional antibiotics.
- 56 children (16.00%) received ≤ 3 days of antibiotic therapy prior to the presenting ADR and received no subsequent treatment deeming these avoidable ADRs. Cost of these avoidable ADRs alone totaled \$68,377.50.

Conclusions

- ADRs result in patient harm and medical care utilization.
- The burden of ADRs among children is significant with greater than one child per day seeking medical care at our institution due to an undesired drug reaction.
- Antibiotics cause the large majority of pediatric ADRs resulting in ED/UC visits and a proportion of these ADRs appear to be avoidable.
- Pediatric ADRs are costly and result in additional medical treatment. ADRs represent a large area of potential cost savings for children's hospitals nationwide.
- Our findings likely underestimate the true burden of pediatric ADRs.
- Antimicrobial stewardship strategies to reduce unnecessary antibiotic prescribing need to incorporate the message of ADR risk.

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Disclosure

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