

Prevalence and Characteristics of Non-Beta-Lactam Allergy Labeling at a Children's Hospital

TO THE EDITOR—While the impact of incorrect beta-lactam (BL) allergy labeling has been described [1, 2], there are limited data about non-beta-lactam (NBL) allergy labeling, especially in children. We conducted a retrospective review of reported NBL and BL allergies in 2015 at our academic children's hospital and 10 associated outpatient centers. Initial encounters, defined as first registration in the hospital health system for any clinic visit, urgent care visit, ambulatory surgery, or hospitalization, were chosen to quantify first opportunities for adjudication and referral to allergists. Allergy status was extracted from allergy fields in the electronic health record (EHR). Additional data included demographic information, NBL drug class categorization, severity and description of reactions, and International Classification of Diseases (ICD)-9/10 diagnostic codes. Descriptions of reactions were free text and based on patient reporting. The severity of reaction (high, medium, and low) was subjective and input directly in the EHR by providers and was not determined by the study team. A few descriptions of reactions auto-populated the severity field (eg, "hives" and "rash" auto-filled high and low, respectively) but could be changed by the

provider. NBL allergies were categorized based on severity and grouped by type of reaction description.

Of 35 796 patients with first clinical encounters, 324 (0.9%) and 1370 (3.8%) had ≥ 1 NBL or BL allergy reported, respectively, and 101 (0.3%) patients had both reported. Fifteen patients had 2 and one had 3 NBL allergies. Chronic conditions, defined by ICD-9/10 code groupings using Systematic Nomenclature of Medicine-Clinical Terms [3], included gastrointestinal disease (51, 15.7%), neurological disease (37, 11.4%), malignancy (36, 11.1%), and cystic fibrosis (5, 1.5%).

The median age of patients with NBL allergy was 9.0 years (Interquartile Range [IQR] 6.3, 16.1) and were first noted at ambulatory care visits (283, 87.3%) and hospitalizations (41, 12.7%). The 324 patients had 341 reported NBL drug class allergies for 344 individual antibiotics, as 3 patients had 2 unique drug allergies reported in the same drug class (macrolides). The most commonly reported NBL class allergies were sulfonamides (46%), macrolides (31.4%), vancomycin (7.9%), clindamycin (6.5%), and fluoroquinolones (2.6%). Allergy severity was not listed for 188 of the 344 (55%) reported NBL allergies. Of 149 NBL antibiotics with "high" allergy severity listed, 84% had no further information provided. All patients with reported vancomycin allergy had red man syndrome or no description provided. Overall, 294 (85%) of reported NBL allergies provided no description (Table 1). The 13 descriptions of reactions consistent with urticaria or angioedema were associated with sulfonamides (8), macrolides (3), aminoglycosides (1), and metronidazole (1). The 2 instances each of Steven-Johnson syndrome and glucose-6-phosphate-dehydrogenase (G6PD) deficiency were due to sulfonamides.

Consistent with other reports, we found that NBL allergies are likely overreported in children [4, 5]. Potential interventions in the EHR to improve allergy reporting include

mandatory fields for reaction descriptions to distinguish from adverse drug reactions and clear criteria for labeling severe reactions. Referral to allergists for testing and oral challenge may facilitate successful NBL allergy de-labeling [5]. Interdisciplinary collaboration with pharmacists and allergists may preserve antibiotic options for children with chronic medical conditions [6].

Amanda M. Miceli,¹ Shan Sun,² Tonya L. Scardina,³ Ajay Bhasin,^{4,5} Larry K. Kocielek,^{1,6} Rachel G. Robison,^{1,6} and Sameer J. Patel^{1,6}

¹Pediatric Infectious Diseases, Ann & Robert H. Lurie Children's Hospital of Chicago, Chicago, Illinois, USA,

²Data Analytics and Reporting, Pediatric Infectious Diseases, Ann & Robert H. Lurie Children's Hospital of Chicago, Chicago, Illinois, USA, ³Pharmacy Antimicrobial Stewardship Coordinator, Department of Pharmacy, Ann & Robert H. Lurie Children's Hospital of Chicago, Chicago, Illinois, USA, ⁴Pediatrics, Internal Medicine, Ann Robert H. Lurie Children's Hospital of Chicago, Chicago, Illinois, USA, ⁵Pediatrics, Internal Medicine, Northwestern University Feinberg School of Medicine, Chicago, Illinois, USA, and ⁶Pediatrics, Northwestern University Feinberg School of Medicine, Chicago, Illinois, USA

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Corresponding Author: Amanda M. Miceli, PharmD, Pediatric Infectious Diseases, Ann & Robert H. Lurie Children's Hospital of Chicago, 225 E. Chicago Ave., Chicago, IL 60611, USA. E-mail: miceliandamanda2@gmail.com.

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Table 1. Description of Reactions Labeled as Non-Beta-Lactam (NBL) Allergy (n = 344)

	n (%)
NBL allergy description	
No description	294 (85)
Angioedema/urticaria	13 (3.8)
Non-dermatological, self-resolving reaction ^a	11 (3.2)
Non-urticarial rash	11 (3.2)
Family history of antibiotic allergy	8 (2.3)
Gastrointestinal symptoms only	3 (0.87)
Stevens-Johnson Syndrome	2 (0.58)
G6PD deficiency	2 (0.58)
Anaphylaxis	0

^aNon-dermatological, self-resolving reactions included headache, fatigue, and limb pain.