

## Pharmacist-driven penicillin allergy assessment and delabeling to reduce the use of non-beta-lactam alternatives

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### Background

Approximately 10-20% of hospitalized patients report an allergy to penicillin, which results in the use of alternative antibiotics<sup>1</sup>. Often these selections are too broad-spectrum, have a higher risk of adverse events and come at a greater financial cost<sup>2</sup>. Over 50% of reported “allergies” are non-immunologic and represent adverse drug reactions or intolerances, such as nausea<sup>3</sup>. Even when a true allergy has occurred, IgE-mediated penicillin allergies wane over time, with up to 80% of patients losing sensitivity over the course of ten years<sup>4</sup>. The discrepancy in these numbers indicates a significant opportunity for improved assessment strategies by pharmacists and other healthcare practitioners. By performing patient allergy interviews, errant allergies can be removed from the patient chart resulting in improved patient care.

### Purpose

The objective of this project was to evaluate the frequency of appropriate beta-lactam use and pharmacist and provider awareness of the importance of true allergy identification.

### Methods

**Study Design** • Single center, prospective allergy interviews with intervention

**Time** • June 2, 2020 – September 28, 2020

#### Primary Objective

The goal was to decrease the use of non-beta-lactam antibiotics by delabeling penicillin allergies using simple methods such as patient interview, review of historical inpatient medication history and outpatient prescription fill.

#### Secondary Objective

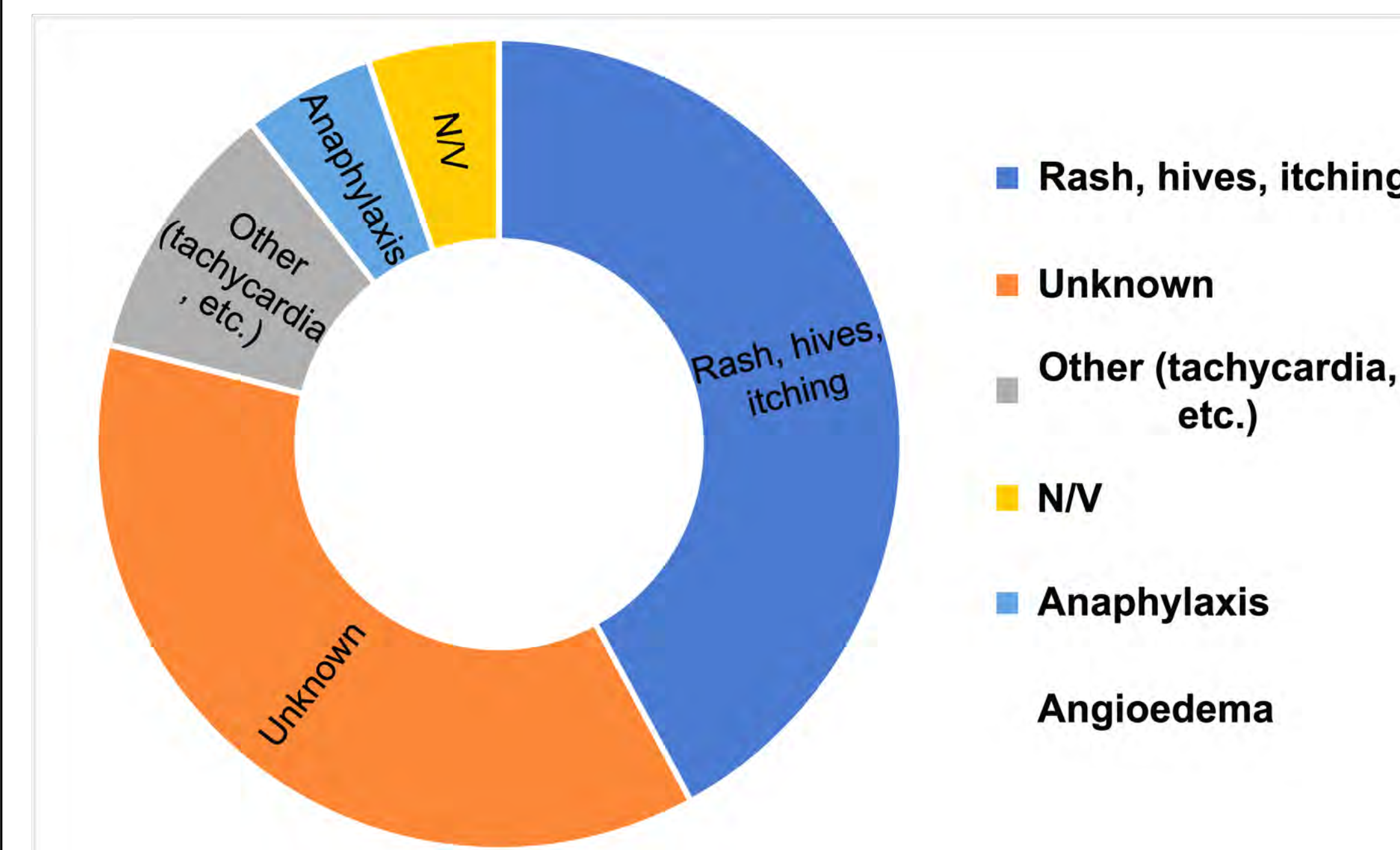
The secondary objective was to determine the number of patients with penicillin allergies listed that tolerate cephalosporins.

### Patient Population

#### Inclusion Criteria

- Patients reporting allergy to penicillin
- Admission to U of L Health - Jewish Hospital on 4 West or 6 Tower
- New orders for non-penicillin antimicrobials during my shift

Figure 1. Type of Penicillin Reaction Reported (n=23)



#### Baseline Characteristics

Demographics	Audit Group (n=23)
Age in years, median	61.5
Female, n (%)	17 (73.9)
Male, n (%)	6 (26)
Weight in kg, median	72.6
COPD, n (%)	8 (34.8)
CHF, n (%)	6 (26)
Diabetes, n (%)	6 (26)
<b>Infectious process</b>	
Pneumonia, n (%)	9 (39.1)
UTI, n (%)	5 (21.7)
Intraabdominal, n (%)	5 (21.7)
SSTI, n (%)	3 (13)
Bacteremia, n (%)	1 (4.3)
<b>Penicillin reaction</b>	
Rash/hives/itching, n (%)	8 (34.8)
Unknown, n (%)	7 (30.4)
Other (tachycardia, etc.), n (%)	2 (8.7)
Nausea/vomiting, n (%)	1 (4.3)
Anaphylaxis, n (%)	1 (4.3)
Angioedema/throat swelling, n (%)	0
<b>First documented allergy</b>	
Over 20 years, n (%)	23 (100)
10-20 years	0
Less than 5 years	0
<b>Tolerated beta-lactams in the past</b>	
Cephalosporin, n (%)	14 (60.9)
No/unknown, n (%)	5 (21.7)
Penicillin, n (%)	4 (17.4)

### Results

Figure 2. Antibiotic Utilization Pre and Post Interview

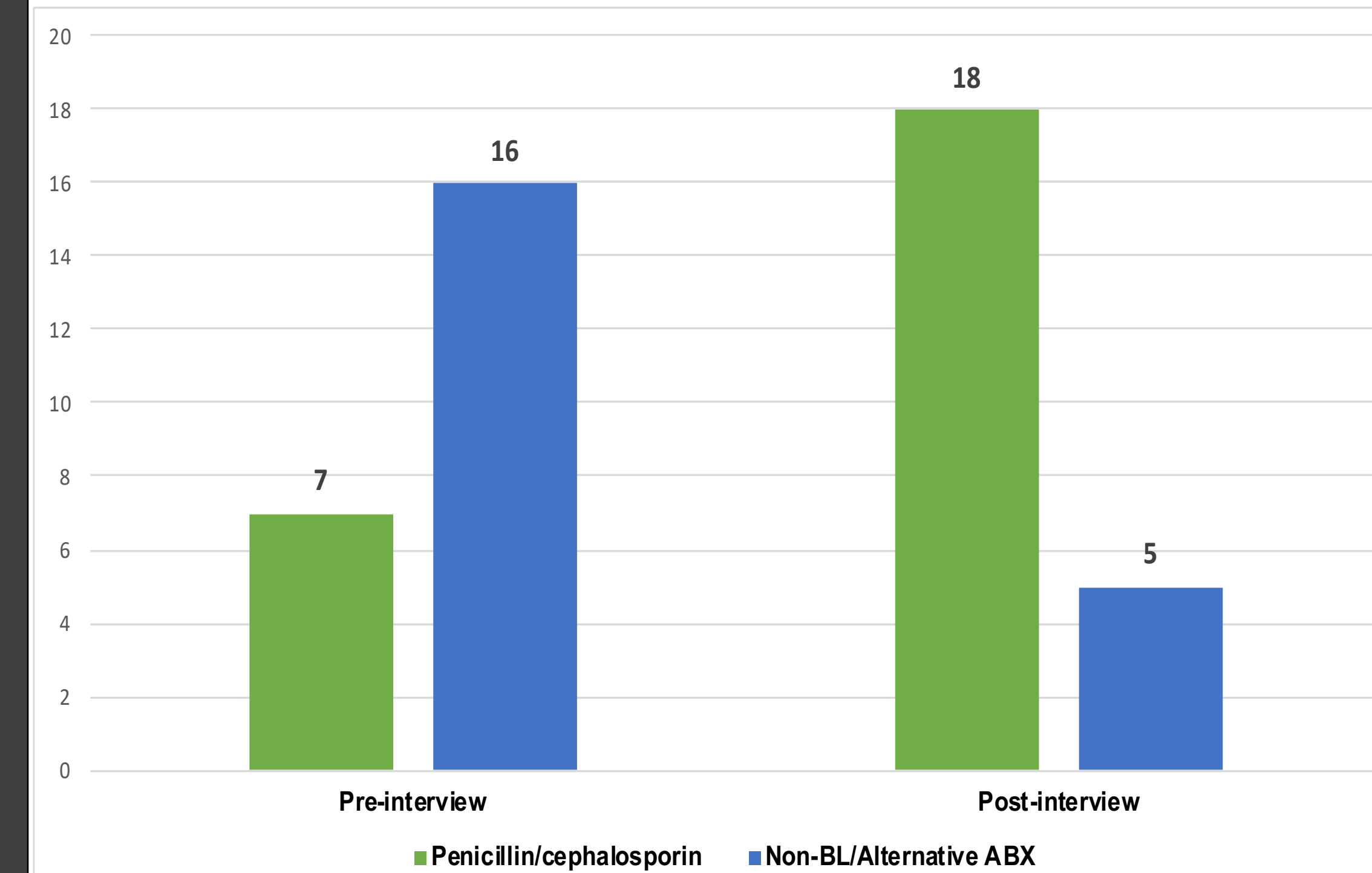
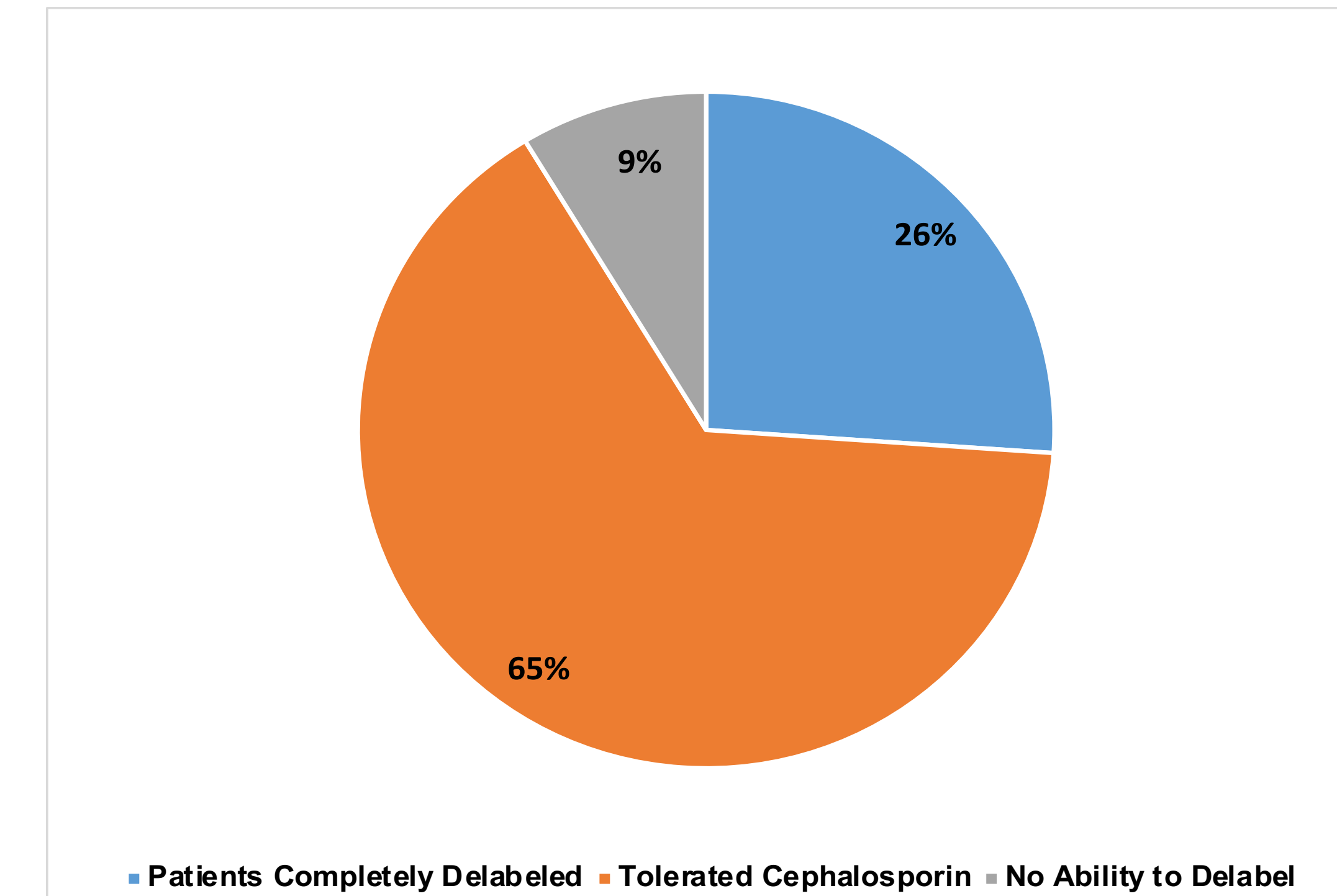


Figure 3. Delabeling of Patient Allergies



### Results

Initially a two-week run-in audit was performed to identify the percent of patients who claimed to have penicillin allergy. Thirty-eight of 170 patients (22%) reported penicillin as an allergy, higher than average. After the two-week period, I then did prospective allergy interviews and interventions. Interviews were completed on 23 patients. Pneumonia was the most frequent infectious process being treated (39%). Rash, hives and itching were the most frequently reported penicillin reaction (35%). Twenty-six percent of patients were completely delabeled post interview, resulting in 65% (n=23) of patients successfully deescalated to a cephalosporin and the remaining 9% of patients continued the originally ordered antibiotic and were not delabeled. In lieu of removing allergies, they were updated with details of reaction with dates in the EMR to prevent future relabeling.

### Discussion/Conclusions

The results of this prospective interview with intervention provide more evidence for continued efforts from pharmacists in antibiotic stewardship. Simple measures such as patient interviews and review of prescription fill history are extremely effective at delabeling patients and deescalating broad-spectrum antibiotics. Barriers encountered include providers unwilling to change therapy or hesitant to use penicillin despite low-risk reaction. There is continued need for education of pharmacists, providers and patients regarding the legitimacy of penicillin allergies.

Future Directions

Longitudinal Residency Project

Standardized beta-lactam allergy questionnaire as a pharmacy education tool

### Limitations

- Single center
- Small sample size
- Self-reported allergy reactions

### References

1. Bourke J, Pavlos R, James I, Phillips E. Improving the Effectiveness of Penicillin Allergy De-labeling. J Allergy Clin Immunol Pract. 2015 May-Jun;3(3):365-34.
2. Macy E., Contreras R. Health care use and serious infection prevalence associated with penicillin “allergy” in hospitalized patients: A cohort study. J. Allergy Clin. Immunol. 2014;133:790–796.
3. Sade K., Holtzer I., Levo Y., Kivity S. The economic burden of antibiotic treatment of penicillin-allergic patients in internal medicine wards of a general tertiary care hospital. Clin. Exp. Allergy. 2003;33:501–506.
4. Shenoy ES, Macy E, Rowe T, Blumenthal KG. Evaluation and Management of Penicillin Allergy: A Review. JAMA. 2019 Jan 15;321(2):188-199.

### Disclosure

Authors of this presentation have nothing to disclose concerning possible relationships with commercial entities that may have direct or indirect financial or personal interest in the subject matter of this presentation.