

# Improving Documentation of Penicillin Allergies Through Provider-Focused Education

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## Background and Objective

- Background
  - ~10% of U.S. patients report having an allergic reaction to a penicillin class antibiotic but fewer than 1% of the population are truly allergic.<sup>1</sup>
- Problem Statement:
  - Misdiagnosed of allergies to penicillin-based antibiotics increase cost of care, worsen microbial resistance patterns, and lead to unnecessary treatment with more toxic and less effective alternatives.<sup>2</sup>
- Project Aim:
  - Quantify misdiagnosis and mislabeling of penicillin allergies at Thomas Jefferson University Hospital.
  - Educate our colleagues on appropriate allergy labeling and facilitate delisting allergies when appropriate.

## Methods and Baseline Metrics

Methods: We performed a chart review of patients admitted to 17 inpatient medicine teams over a 2 week period (one week pre-intervention and one week post-intervention) in March 2022 and reviewed listed allergies, reactions, whether patients received antibiotics during the admission, and whether their allergy documentation was modified. We also surveyed Internal Medicine residents testing their knowledge of penicillin allergies before and after a resident education session.

- Of patients on the 17 teams during the pre-intervention week (p=350), 56 (16%) patients had a penicillin allergy listed.
- Of the patients with active penicillin allergies listed (p=56):
  - 38 (68%) patients received some antibiotic therapy during their hospitalization
  - 6 (10.7%) patients received penicillin class medications during the hospitalization
  - 13 (23.2%) patients had documentation in their medical record of tolerating penicillin class antibiotics in the past
  - 9 (16.1%) patients had "Not specified" or "Unknown" as reactions listed as their allergic reaction.

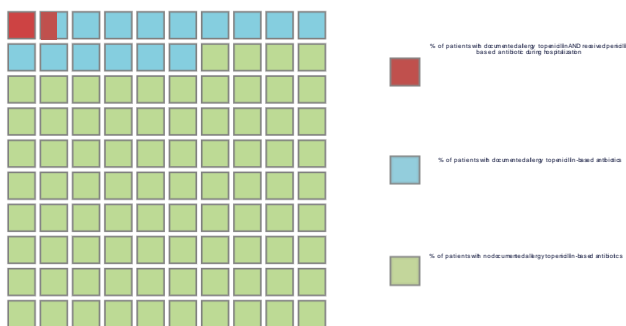
## Intervention and Results

Interventions:

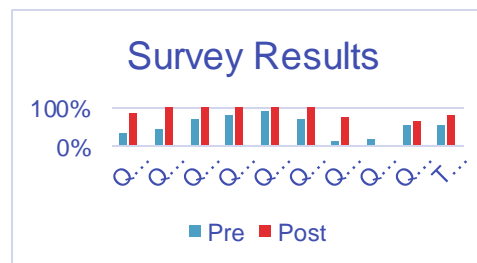
- 1) Deployment of a dot phrase including Jefferson's antibiotic allergy guidelines and question prompts to aid in the assessment of penicillin allergies
- 2) An education session to Internal Medicine residents regarding antibiotic allergies and the usage of the antibiotic allergy dot phrase

Results:

- There was one change in antibiotic documentation reducing reaction's severity.
- There were no penicillin allergies delisted.
- There was an improvement in resident knowledge regarding penicillin allergies based on post-intervention survey data.



Pre and Post Intervention Survey Data Regarding Resident Knowledge of Penicillin Allergies



## Challenges and Lessons Learned

Challenges:

- Limited audience for education and dot-phrase rollout
- Electronic medical record easily allows perpetuation of allergies from encounter to encounter
- Less incentives for inpatient teams to update allergy documentation

Lessons learned:

- Penicillin allergy mislabeling exists among our patients and results in changes in management.
- Providers are wary of delisting penicillin allergies even when patients have tolerated them.

## Future Directions

- Increase utilization of the graded-challenge protocol (currently underutilized; only 8 graded challenges in last year)
- Integrate Epic Best Practice advisory reminding providers to de-list penicillin allergies if patient recently tolerated a penicillin-based antibiotic
- Interventions directed toward outpatient/primary care providers

## Linkage to Healthcare Disparities

- Previous work has demonstrated racial disparities in antibiotic choice and infection management.<sup>3</sup>
- There may be a racial disparity in penicillin allergy labeling.<sup>4</sup>
- Accurate documentation of penicillin allergies through provider and patient-focused education may help to reduce adverse outcomes associated with more toxic or less effective, second-line antibiotics in at-risk patient populations.

1. American Academy of Allergy, Asthma and Immunology, the American College of Allergy, Asthma and Immunology, and the Joint Council of Allergy, Asthma and Immunology. Drug Allergy: An Updated Practice Parameter. Annals of Allergy, Asthma & Immunology. 2010;105(4):P259-273.

2. Castells M, Khan DA, and Phillips EJ. Penicillin Allergy. New England Journal of Medicine. 2019;381:2338-2351.

3. Wurcel AG et al. Variation by Race in Antibiotics Prescribed for Hospitalized Patients With Skin and Soft Tissue Infections. JAMA Network Open. 2021;4(12):e2140798.

4. Albin S and Agarwal S. Prevalence and Characteristics of Reported Penicillin Allergy in An Urban Outpatient Adult Population. Allergy and Asthma Proceedings. 2014;35(6):489-494.