# Effectiveness and Feasibility of Pharmacist-Driven Penicillin Allergy De-Labeling Pilot Program

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## BACKGROUND

- Prevalence of true hypersensitivity to penicillins is low (0.5-2%).[1]
- Documented penicillin allergies have been associated with an increased risk of adverse outcomes, including methicillin-resistant *Staphylococcus aureus* infections, *Clostridioides difficile* infections, and surgical site infections.[2,3]
- "De-labeling" of inappropriately documented allergies can decrease the use of unnecessary broad-spectrum antibiotics and prevent negative outcomes, but labor-intensive skin testing and direct oral challenges can be a barrier to implementation.

## OBJECTIVES

- The primary objective was to assess the effectiveness (number of patients de-labeled) and feasibility (time spent) of a pharmacist-led process of penicillin allergy de-labeling without skin testing or direct oral challenges with penicillin agents.

## METHODS

- Inclusion criteria: Adult patients (18 years of age or older) with a documented penicillin allergy identified via an EHR report and admitted to one of two medical/surgical units or three labor/delivery and high-risk pregnancy units within the 3-month pilot period (October 23rd, 2019 – January 10th, 2020).
- Exclusion criteria: Patients declining interviews and/or unable to be interviewed.
- Identified patients were interviewed by an infectious diseases pharmacy resident, and an allergy history was assessed utilizing a standardized checklist (Appendix 1). Using the patient's answers and an evidence-based, standardized checklist, the pharmacist determined if an allergy qualified for de-labelling.
- All documentation included a detailed allergy history along with a beta-lactam cross-reactivity chart to help guide future antibiotic choices (Appendix 2-3).

## RESULTS

**Table 1. Number of patients de-labeled**

| | MB (n=23) | Med/Surg (n=43) | Total (n=66) |
|---|---|---|---|
| De-labeled | 4 | 8 | 12 |
| Intolerance | 1 | 3 | 4 |
| Potential true allergy | 18 | 32 | 50 |

'MB': 3 labor/delivery and high-risk pregnancy units; 'Med/surg': 2 medical/surgical units; 'Intolerance': Patients met criteria for de-labeling, but declined removal of the allergy from the chart.

**Table 2. Time spent during the patient interview**

| | Time spent (min) |
|---|---|
| Mean | 5.2 |
| Median | 5 |
| Minimum | 3 |
| Maximum | 15 |

**Table 3. Patients tolerating a beta-lactam antibiotic after de-labeling (as of April 2020)**

| Prescribed antibiotics after de-labeling/or re-labeling as intolerance | Tolerated a beta-lactam agent after de-labeling | Agents tolerated | |
|---|---|---|---|
| De-labeled 7/12 (58.3%) | 7/7 (100%) | Amoxicillin/Clavulanate | 1 |
| | | Piperacillin/Tazobactam | 1 |
| | | Cephalexin | 4 |
| | | Cefazolin | 2 |
| | | Ceftriaxone | 3 |
| | | Cefepime | 2 |
| Intolerance 1/4 (25%) | 1/1 (100%) | Ampicillin/Sulbactam | 1 |
| | | Cefuroxime axetil | 1 |
| Total 8/16 (50%) | 8/8 (100%) | | |

## DISCUSSION

- Result of this study suggests de-labeling alone is a feasible and effective alternative to more time & resource intensive skin testing. The development of the standardized checklist allows pharmacists to be highly efficient in conducting the de-labeling process.
- Several tools within the EHR were utilized to improve documentation and optimize potential prescribing of beta-lactams on patients with beta-lactam allergies
  - Proper categorization of 'intolerances' prevented warnings from triggering upon order entry and verification of beta-lactam agents.
  - The beta-lactam cross reactivity chart in the progress note served as a guide to alternative antibiotic options with low risk of cross-reactivity in patients with true penicillin allergies.
- A unique population of maternity units were chosen to improve appropriate prescribing in GBS prophylaxis. Due to many logistical challenges (e.g. starting on GBS prophylaxis prior to pharmacist interview, patient preference of not wanting interruption), targeting these patients during routine prenatal care visits may be a better approach.
- Limitations:
  - Unable to capture patients with a remote history of an allergic reaction.
  - Observational nature and limited follow-up period
  - Single-center study. Baseline penicillin allergy rate was ~20% at our institution, which is higher than the national reported average.[4]
  - Possibility of re-addition of the allergy after removal of the allergy.
- The 18% rate of de-labeling based on a targeted interview alone was higher than a literature reported rate of 13%,[5] likely due to the algorithm not requiring direct oral challenge in patients who had an unknown remote history or family history of a penicillin allergy.

## CONCLUSION

- A pharmacist-led penicillin allergy de-labeling process without skin-testing or oral challenges utilizing a standardized checklist is an effective and feasible method in removing penicillin allergies in patients who do not have a true allergy to penicillins. Improved documentation of the allergy history and the information regarding the beta-lactam cross-reactivity served as a useful tool in selecting safe alternative options in patients with true penicillin allergies. These strategies can help sites without the resources to conduct skin testing or direct oral challenges reduce the potential detrimental health and economic impact that inappropriately documented penicillin allergies can have.

## APPENDIX

- Appendix 1 Penicillin Allergy History Toolkit
- Appendix 2 Template to document in allergy section
- Appendix 3 Template progress note
- Scan the QR code using your smartphone or click this link to view appendices.

### DISCLOSURES

Authors have no conflicts of interests regarding personal or financial relations with commercial entities that may have influenced the content or subject matter of this presentation. This study was reviewed by the Allina Health System Institutional Review Board and did not meet Human Research Criteria.

### REFERENCE

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