Reassessment of Documented Penicillin Allergies: Implications on Antibiotic Selection and Clinical Outcomes in Hospitalized Adults

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ABSTRACT

Context: Penicillin allergies are commonly reported in healthcare settings, often leading to the use of alternative antibiotics. However, many reported penicillin allergies are inaccurate, resulting in suboptimal treatment, higher healthcare costs, and increased antibiotic resistance.

***Objective*:** The study aimed to assess the accuracy of documented allergies to medications within the penicillin class. To investigate, the prevalence of reactions to administered penicillins among hospitalized adults with a reported history of penicillin allergy was examined. Additionally, the influence of documented allergies on the prescribing of alternative antibiotics was inspected. By analyzing patient reactions to penicillin and examining the use of alternative antibiotics, the study sought to provide insights into the reliability of allergy documentation in electronic health records and its impact on antibiotic prescribing practices.

Design, Setting, Participants: This retrospective study examined the incidence of allergic reactions among hospital adults with documented penicillin allergies across a large healthcare system. The study covered the period from January 1st, 2022, to May 31st, 2024, focusing on patients aged 18 and older. Data was extracted from Epic's SlicerDicer tool and further refined using SQL queries from Epic's Clarity database, ensuring comprehensive and accurate data collection. Patients included in the study had a documented allergy to any medication within the penicillin class.

Main Outcome and Measures: The primary outcome was the prevalence of allergic reactions following the administration of penicillin to these patients. Secondary outcomes involved analyzing the impact of documented allergies on the prescribing patterns of antibiotics,

particularly the selection of alternative antibiotics when penicillin was avoided. The data was processed using Microsoft Excel, where advanced functions such as V-lookup were used to merge and clean data. Statistical analyses, including Chi-squared tests and Fisher's exact tests, were performed to evaluate differences in reaction rates and the influence of documented allergies on antibiotic selection.

Results: The study evaluated 4,456 hospitalized adults with documented penicillin allergies, where 778 received a penicillin and 3,678 were prescribed alternative antibiotics. Among those given penicillin, only 2.6% (20 patients) experienced a reaction, with hives being the most common (50%, $p < .00001$). Notably, many observed reactions differed from the originally documented allergy, raising concerns about the accuracy of allergy records.

Patients who re-reacted were younger on average (49.9 years) compared to those who tolerated penicillin (60.8 years), suggesting a potential age-related decline in hypersensitivity. Black or African American patients were more likely to receive penicillin (11.2%) than White or Caucasian patients (7.3%, $p = .000353$), highlighting possible disparities in prescribing. Among patients receiving alternative antibiotics, 44.7% were given cephalosporins, despite concerns about cross-reactivity.

Conclusion: The study highlights the importance of reevaluating documented penicillin allergies. Many patients with reported penicillin allergies can tolerate medications in the penicillin class without adverse reactions, indicating that some documented allergies may no longer be valid or were inaccurately labeled. Retesting can help identify these cases, allowing healthcare providers to confidently prescribe penicillins when appropriate. This approach

improves patient care by avoiding the use of alternative antibiotics when clinically unnecessary and supports better antibiotic stewardship. Regular retesting and re-evaluation of allergies could be integrated into clinical practice to enhance the accuracy of allergy documentation and optimize treatment outcomes.