

Standardizing Accurate Penicillin Drug Allergy Diagnosis via a Smartphone App



Nicholas L. Rider, DO *Houston, Texas*

In this issue of the journal, Elkhalfa et al¹ report on the development of a mobile application for clinical decision support (CDS) to enable accurate penicillin allergy diagnosis in a systematic manner. “The Drug Allergy App” consists of a 10-item questionnaire derived from the UK National Institute for Health and Care Excellence guidelines on drug allergy and was validated on retrospective clinical data extracted from regional dermatology centers in Manchester, UK.² The authors informed their creation of this mobile app by analyzing survey results from 164 prescribers to determine critical barriers toward the optimal practice for drug allergy diagnosis. They noted significant barriers to be perceived including lack of time and improper preparation for collecting the needed history among 55.2% (95% confidence interval [CI]: 47%-63.4%) of surveyed prescribers. This led nearly 60% (59.4%; 95% CI: 51.4%-67.5%) of those surveyed to simply avoid all beta-lactam antibiotics without further intervention.¹ Given these findings, “The Drug Allergy App” was conceived to facilitate, streamline, and enable best practices for accurate penicillin allergy diagnosis or refuting this to enable delabeling of misclassified drug allergy. In addition, their mobile application is interoperable with the most prevalently used smartphone operating systems and can be leveraged by Android or Apple iOS users.

To test and validate their mobile app, Elkhalfa et al used retrospective data from 100 true drug allergy positive and 100 true negative adult individuals. Among patients with a type 1 drug hypersensitivity history, the application sensitivity, specificity, and positive predictive value (PPV) was noted to be 79.7%, 85%, and 79.7%, respectively, whereas the negative predictive value (NPV) was 100%. For those with a delayed, severe drug history, sensitivity, specificity, PPV, and NPV were all 100%. Lastly, for subjects with a negative drug hypersensitivity history, sensitivity, specificity, PPV, and

NPV were 85%, 100%, 100%, and 79.7%, respectively. These results suggest that the history-driven app performs well for discrimination of true drug hypersensitivity or lack thereof.¹

A rationale for the development of “The Drug Allergy App” is in alignment with a need to proactively verify or refute drug hypersensitivity and is supported by other studies. In particular, 10% to 15% of hospitalized patients have a documented penicillin allergy, whereas rigorous history and challenge refutes over 90% of such claims providing evidence for a burden of misinformation that is necessary to address.³ Inaccurate drug hypersensitivity labeling leads to a variety of well-documented and suboptimal outcomes stemming from avoidance of first-line, most appropriate antimicrobial therapies. These include increased health care expenditures, greater rates of nosocomial infection, the emergence of resistant organisms, and treatment failures.⁴⁻⁶ Other system-wide initiatives have been developed and have shown promise for accurate delabeling of misclassified penicillin allergy. Along these lines, the use of telemedicine rubrics, pharmacist-driven protocols, and the implementation of an integrated testing program are effective means of ascertaining the veracity of a drug hypersensitivity claim.⁷⁻⁹

Although the present study conducted by Elkhalfa et al¹ has been conducted retrospectively, the authors plan further validation through a multicenter prospective trial. This next step will be important to ensure generalizability of their tool across health systems and to further validate the usability of “The Drug Allergy App” in the hands of additional users. Ultimately, seamless integration of the app findings into the electronic health record (EHR) and clinical workflows will be vital for ease of documentation in accordance with best CDS practices and to limit such related burdens to providers who must currently interact with multiple siloed digital platforms while providing patient care.

As encapsulated in this editorial and further expanded upon in the paper by Elkhalfa et al, the burden of literature related to accurate reporting and assessment of drug hypersensitivity reflects a need to facilitate systematic means for addressing the problem of erroneously labeling a patient with drug allergy. Digital tools such as “The Drug Allergy App” are necessary for improving and extending EHR functionality, thereby allowing for integration of validated and efficient methods for history taking. In particular, tools like this app that are developed by domain experts within the allergy-immunology community are critical for ensuring that the optimal outcomes are achieved as called for elsewhere within the spectrum of our field.¹⁰ By coupling domain expertise and thoughtful attention to both the design and validation of applications, tools, scoring systems, and wearable technology, we will further refine processes and bring greater value to patient care interactions.

Section of Immunology, Allergy and Retrovirology and the William T. Shearer Center for Human Immunobiology, Texas Children’s Hospital, Baylor College of Medicine, Houston, Texas

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Corresponding author: Nicholas L. Rider, DO, Baylor College of Medicine, Feigen Center, 1102 Bates Avenue, Suite 330, Houston, TX 77030. E-mail: nlrider@bcm.edu.

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Ultimately, it will be important for the medical community at large to become comfortable with assessing claims related to drug hypersensitivity. This process is vital in both the inpatient and outpatient settings. Digital tools such as “The Drug Allergy App” should allow nonallergists to feel comfortable with such assessments and lead to more delabeling where appropriate and less avoidance of needed medications. In this way, validated methods for refining clinical processes can drive toward the aims of improving population health and reducing health care–associated expenditures. Once fully validated in a prospective fashion, “The Drug Allergy App” could be leveraged by any health system to allow for widespread assessment about drug hypersensitivity claims. Those patients who need expert consultation by allergist-immunologists can be referred, whereas those without such needed evaluation could proceed to delabeling and may be given the most appropriate antimicrobial therapies that suit their clinical scenario. Allergist-immunologists will still be needed to refine health system processes and decision-making for operationalizing a drug hypersensitivity delabeling program and to evaluate those individuals deemed to have true drug allergy. However, tools like “The Drug Allergy App” will extend the allergist-immunologist community by providing a systematic means for triaging patients by reducing the barriers related to this activity. In the end, the right patient can receive the optimal medication, and ultimately the allergist will receive the most appropriate referrals.

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