



Letter

Antibiotic reclamation: penicillin allergy, antibiotic stewardship, and the allergist

During the past decade, interest, mounting evidence, and increasingly vigorous calls have all revolved around the issue of implementing antibiotic stewardship programs (ASPs). This movement crystallized into a formalized structure and approach with a policy statement jointly published by the Society for Healthcare Epidemiology of America (SHEA), the Infectious Diseases Society of America, and the Pediatric Infectious Diseases Society in 2012.¹ This was followed by a recommendation issued in 2014 by the Centers for Disease Control and Prevention, urging hospitals in the United States to adopt ASPs.² These developments mirror efforts across other nations to stem the continuing spread of antimicrobial resistance, a threat that has been further exacerbated by a dearth of novel antimicrobial agents in recent years.^{2,3} The focus on the lack of new agents overlooks the untapped potential of reclaiming the use of first-line therapies, such as β -lactams, unavailable to some patients because of a documented or reported allergy.

The SHEA outline for ASPs highlights a number of concepts. One concept is the need for a multidisciplinary approach; however, although the focus is rightly placed on primary care and infectious disease resources, allergist-immunologists are not enumerated as key allies.¹ Another foundational idea promoted by the SHEA policy statement is to define and address factors that drive the use of inappropriate antibiotics.¹ A critical impetus pushing practitioners away from first-line antibiotic therapies is a patient history of adverse reaction to antibiotics and specifically to penicillin or a related β -lactam.^{4–6} Allergist-immunologists are ideally suited to partner with colleagues in the fields of infectious disease and primary care to directly address this significant impediment in efficiently practicing antibiotic stewardship.

Estimates of the prevalence of documented, but often unevaluated, penicillin allergy range from 8% to 20% of the general population.^{7,8} Skin prick and intradermal testing with appropriate positive (histamine) and negative (saline/glycerin) controls and using the major determinant, penicilloyl-polylysine, penicillin G, and ampicillin where available and approved, represents a standardized, widely accepted, and safe means of assessing IgE-mediated penicillin allergy.⁷ Antihistamines interfere with skin prick and intradermal testing, and patients should be asked about their use. After negative test results with adequate controls, oral challenge is an effective means of clearing patients for penicillin administration with little to no risk of resensitization.^{7,9} With the use of such methods, less than 10% of the population with a reported penicillin allergy is found to have positive testing or

challenge results.^{4,5,7} Allergist-immunologists represent a skilled set of practitioners, adept at using these tools that can safely evaluate and in most cases clear the substantial portion of the population with a listed penicillin allergy.

Recognizing this important and unexplored partnership within an ASP, infectious disease and allergy-immunology physicians at our institution developed a novel approach to addressing the unmet needs of patients with a documented or reported penicillin allergy. As outlined in Figure 1, patients admitted to the general wards or intensive care unit identified through documentation or report as having a history of a penicillin allergy generate an automatic referral to the allergy-immunology inpatient consult team. The team then assesses the patient and based on a variety of factors, ranging from current management needs to comorbid conditions and recent administration of antihistamines, determines whether additional evaluation will take place during their inpatient stay or in the outpatient setting. To augment identification of reported penicillin-allergic patients, the allergy-immunology team reviews reports from our institution's health care operations team that list all inpatients receiving antibiotics and indicating any identified drug allergies. Through these mechanisms, inpatients with a documented or reported penicillin allergy are rapidly identified, undergo an initial needs-based assessment, and receive either immediate or outpatient evaluation, all under the auspices of the ASP and the close cooperation of our infectious disease and allergy-immunology services.

The significant effect of a documented penicillin allergy on patient care is well described within the allergy literature and mirrors several of the important issues that ASPs seek to address. Patients with a reported penicillin allergy have significantly increased rates of *Clostridium difficile*, vancomycin-resistant *Enterococcus*, and methicillin-resistant *Staphylococcus aureus*. Patients are also often treated with broad-spectrum agents, rather than more narrowly focused β -lactams, potentially exacerbating antimicrobial resistance.^{5,10} Patient safety also arises as a significant issue, both in terms of ensuring rigorous assessment for reported penicillin allergy and also in properly identifying those who have been evaluated as having an immediate hypersensitivity to penicillin and those who have been cleared of such a reaction.^{6,8,11} Finally, in an increasingly cost-conscious environment, penicillin allergy has been linked to longer hospital courses and, in one study, with an overall increased health care cost of 9.5 times that of penicillin allergy testing itself.⁵

Adequately evaluating penicillin allergy represents a significant and critical unmet need. The literature highlights both a pervasive lack of knowledge among practitioners regarding penicillin allergy and a lack of allergy referrals for patients identified as penicillin allergic.^{4,8} Only recently recognizing this need, the infectious

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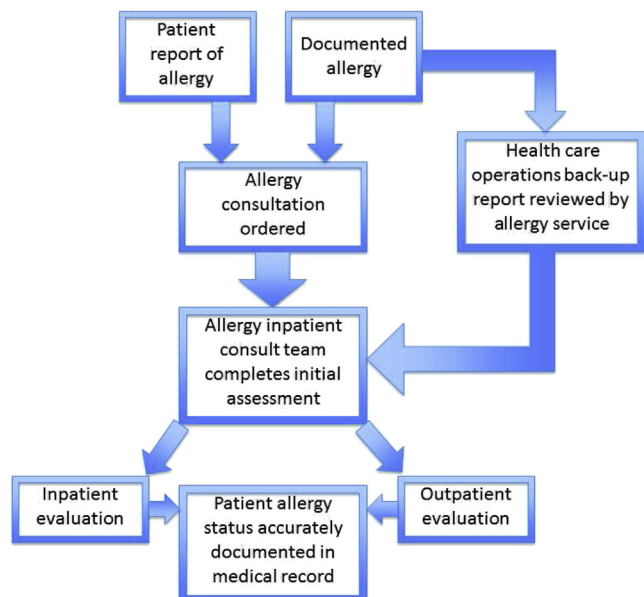


Figure 1. This flow chart depicts our institution's approach to efficiently incorporating allergists-immunologists into the antibiotic stewardship program, assessing inpatients with a reported or documented penicillin allergy. Allergy refers specifically to penicillin reaction. Evaluation can determine patients' status as well as impact current or future management.

disease field has begun to appreciate the power and utility of the testing already available. This is illustrated by the work of Rimawi et al¹⁰ in which infectious disease fellows used skin prick testing to aid in their antibiotic stewardship efforts in the inpatient setting. Given the manifold benefits of assessing and clearing patients with reported penicillin allergy, continued exploration of this area within the context of ASPs is likely.

Penicillin allergy represents a significant impediment to the effective implementation of ASPs. Addressing this unmet need benefits patients, practitioners, hospitals, and society through more focused, safer, and cost-effective treatment. Rather than solely targeting antibiotic conservation and developing novel agents, ASPs can effectively and efficiently reclaim the use of a group of first-line agents previously inaccessible to a significant portion of patients. We present one concept for a cooperative, multidisciplinary

program, but other structures that more fully incorporate surgical services and preoperative planning represent potential alternate frameworks. As experts in hypersensitivity reactions, allergist-immunologists are qualified practitioners who can function as integral components of antibiotic stewardship.

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