Comprehensive Patch Testing: An Essential Tool for Care of Allergic Contact Dermatitis

Kayla Tran, BS; Amber Atwater, MD; Margo Reeder, MD; JiaDe Yu, MD, MS

PRACTICE **POINTS**

- Comprehensive patch testing refers to patch testing beyond a screening series to capture allergens that otherwise would be missed using a limited panel.
- Comprehensive patch testing can identify emerging allergens and shifting allergen trends.
- Recent changes in patch test utilization have the potential to negatively affect patient care.

Patch testing (PT) is the gold standard diagnostic test for allergic contact dermatitis (ACD) and is essential for guiding allergen avoidance. Comprehensive PT refers to the completion of PT for all potentially relevant and testable allergens for a given patient. It is necessary for most patients with contact allergy and can illustrate allergen trends and identify allergens that otherwise would be missed using a limited screening panel. Early identification of relevant allergens leads to clinical improvement, improved quality-of-life, and reduced health care utilization. This article illustrates the clinical and public health value of comprehensive PT and the vital role of allergen access in the comprehensive patch test process.

Allergic contact dermatitis (ACD) is a common skin condition affecting approximately 20% of the general population in the United States.[1] Allergic contact dermatitis is a unique disease in that there is an opportunity for complete cure through allergen avoidance; however, this requires proper identification of the offending allergen. When the culprit allergen is not identified or removed from the patient's environment, chronic ACD can develop, leading to persistent inflammation and related symptoms, reduced quality of life, and greater economic burden for patients and the health care system.[2,3]

Patch testing (PT) is the only available diagnostic test for ACD, allowing for identification and subsequent avoidance of contact allergens. Patch testing involves applying allergens—typically chemicals that can be found in personal care products—onto the skin for 48 hours. Delayed readings are completed 72 to 168 hours after application. Interpretation of relevance and patient counseling, with resultant allergen avoidance, are required for a successful patient experience. Patch testing is considered safe in tested populations; rare risks associated with PT include active sensitization and anaphylaxis.[4]

There are many screening series available, with the number of screening allergens ranging from 35 (T.R.U.E. [Thin-Layer Rapid Use Epicutaneous] test) to 90 (American Contact Dermatitis Society [ACDS] Core series). Comprehensive PT generally refers to the completion of PT for all potentially relevant and testable allergens for a given patient, which typically involves testing beyond a screening series. Currently in the United States, comprehensive PT typically includes testing for 80 to 90 allergens and any additional potentially relevant allergens based on the clinical history and patient exposures. A 2018 survey noted that, of 149 ACDS members, 82% always used a baseline screening series for PT, with 62% of these routinely testing 80 allergens and 18% routinely testing 70 allergens.[5] Additionally, nearly 70% always or sometimes tested with supplemental or additional series. In other words, advanced patch testers were routinely testing 70 to 80 allergens in their screening series, and most were testing additional allergens to ensure the best care for their patients.

To account for emerging allergens, accommodate changes in allergen test concentrations recommended by ACDS and the North American Contact Dermatitis Group

Kayla Tran is from the School of Medicine, Virginia Commonwealth University, Richmond. Dr. Atwater is from the Department of Dermatology, George Washington University School of Medicine and Health Sciences, Washington, DC. Dr. Reeder is from the Department of Dermatology, University of Wisconsin School of Medicine and Public Health, Madison. Dr. Yu is from the Department of Dermatology, Virginia Commonwealth University Health System, Richmond.
Kayla Tran and Dr. Reeder have no relevant financial disclosures to report. Dr. Atwater was previously employed by Eli Lilly and Company. Dr. Yu has served as a consultant, advisory board member, and/or investigator for AbbVie, Arcutis, Astria, Dermavant, iRhythm, Johnson & Johnson, Kiehl's/L'Oreal, LEO, Eli Lilly and Company, the National Eczema Association, O'Glacee, Pfizer, Sanofi, SmartPractice, and Sol-Gel and has received honorarium from UpToDate.
Correspondence: JiaDe Yu, MD, MS, Department of Dermatology, Virginia Commonwealth University Health System, 9109 Stony Point Dr, PO Box 980538, Richmond, VA 23235 (jiade.yu@vcuhealth.org).
Cutis. 2026 February;117(2):46-48. doi:10.12788/cutis.1339

(NACDG), and address the need for comprehensive PT for most patients, recommended screening series are regularly updated by patch test societies and expert panels such as the ACDS and the NACDG. When the ACDS Core series[6] was introduced in 2013, it consisted of 80 recommended allergens.[7] The panel was updated in 2017[8] and again in 2020,[6] most recently with 90 allergens. The NACDG has collected patch test data since at least 1992[9] and revisits their recommended screening series on a 2-year cycle, evaluating test concentrations and adding and removing allergens based on allergen trends, allergen performance, patient need, and emergence of new allergens; the current NACDG series consists of 80 allergens. This article illustrates the clinical and public health value of comprehensive PT and the vital role of allergen access in the comprehensive patch test process, with the ultimate goal of optimizing care for patients with ACD.

Value of Comprehensive Patch Testing for ACD

Early PT represents the most cost-effective approach to the diagnosis and management of ACD. Lack of access to PT can lead to delayed diagnosis, resulting in continued exposure to the offending allergen, disease chronicity, and ultimately worse quality-of-life scores compared with patients who are diagnosed early.[10] Earlier diagnosis also can minimize costs by avoiding unnecessary treatments. Without access to comprehensive PT, patients could potentially be erroneously diagnosed with atopic dermatitis and subsequently treated with expensive biologic therapies (eg, dupilumab, which costs approximately $4000 per dose or $104,000 per year[11]), when allergen avoidance would have been curative with minimal cost. The continued value of comprehensive PT, especially in the era of the atopic dermatitis therapeutic revolution, cannot be more strongly emphasized.

Among 140 patients with ACD, 87% found PT useful, 91% were able to avoid allergens, and 57% noted improvement or resolution of their dermatitis after avoidance of identified allergens.[12] A multicenter prospective observational study demonstrated that PT improved dermatology-specific quality of life and reduced resources used for patients with ACD compared to non–patch tested individuals.[13] Another study found that patients with ACD who underwent PT and were confirmed as having relevant positive contact allergens showed improvement in both perceived eczema severity and Dermatology Life Quality Index scores just 2 months after testing.[14] This effect is attributed to the identification and subsequent avoidance of clinically relevant contact allergens. In a study of 519 patients with dermatitis, Dermatology Life Quality Index scores improved significantly after PT regardless of whether the results were positive or negative, indicating benefits for the care and treatment of dermatitis, even in the setting of negative patch test results ($P<.001$).[15] This could because they were still counseled on gentle skin care and management of their dermatitis at the PT visit. Improvements in disease severity also have been observed in adults and children after PT, with most patients having partial to complete clearance of their dermatitis.[16,17] This is not surprising, as comprehensive PT allows clinicians to diagnose the cause of ACD by finding the exact allergen triggering the eruption and then guide patients through avoidance of these allergens to eventually clear their dermatitis.

Comprehensive Patch Testing Captures Allergen Trends

Dermatologists who perform PT in the United States currently have access to a diverse array of allergens, with more than 500 different allergens available. Access to and utilization of these allergens are essential for the comprehensive evaluation needed for our patients.

Comprehensive PT has uncovered emerging allergens such as dimethyl fumarate, the potent cause of sofa dermatitis[18]; isobornyl acrylate, which is found in wearable diabetic monitors[19]; and acetophenone azine, which can cause shin guard ACD in athletes.[20] Increasing prevalence of ACD to these allergens would not have been identified without provider access to PT. Patch testing also has identified emerging allergen trends, such as the methylisothiazolinone allergy epidemic.[21] All of these emerging allergens, identified through PT, have been named Contact Allergen of the Year by the ACDS due to their newfound relevance.[18-20]

In contrast, allergen prevalence can decrease over time, leading to removal from screening panels; examples include methyldibromo glutaronitrile, which is no longer widely present in consumer products, and thimerosal, which has frequent positive results but low relevance due to its infrequent use in personal care products. In response to comprehensive PT studies, allergen concentrations may be modified, as in the case of formaldehyde, which has notable irritant potential at higher tested concentrations but remains on the ACDS Core Allergen Series with a test concentration that optimizes the number of true positive reactions while decreasing irritant reactions.[6] Likewise, nickel sulfate test concentrations were increased in the NACDG screening series due to evidence that testing at 5% identifies more nickel contact allergy than testing at 2.5% without considerably increasing irritant reactions.[22]

Allergen Choice and Flexibility are Key to Optimal Screening

Dermatologists who perform PT usually choose their screening series based on expert consensus and recommendations.[6,23] Additional test allergens for comprehensive PT typically are chosen based on patient exposures, regional trends, and clinical expertise. This flexibility traditionally has allowed for the opportunity to identify culprit allergens that are relevant for the individual patient; for example, a hairdresser may have daily exposure to resorcinol, whereas a massage therapist may have regular exposure to essential oils. Testing only a standard screening series may miss the culprit allergen for both patients. For optimal patient outcomes, allergen choice and flexibility are key.

Currently, the 35-allergen T.R.U.E. test is the only US Food and Drug Administration–approved patch test; however, multiple studies have shown that comprehensive PT, including supplemental allergens, considerably improves the diagnostic yield and clinical outcomes in ACD. A 6-year retrospective study found that using an extended screening series identified an additional 10.8% of patients (n=585) with positive tests who were negative to the T.R.U.E. test.[24] Patch testing with the T.R.U.E. test alone would miss almost half of the positive reactions detected by the NACDG 80-panel screening series. Furthermore, an additional 21.1% of 3056 tested patients had at least one relevant reaction to a supplemental allergen that was not present in the NACDG screening series.[23] In a retrospective study of 791 patients patch tested with the NACDG screening series and 2 supplemental series, 19.5% and 12.1% of patients, respectively, had positive reactions to supplemental allergens.[25] This reinforces the importance of comprehensive PT beyond a more limited screening series. Testing more allergens identifies more causative allergens for patients.

Changes in Utilization May Affect Patient Care

Recent data have shown a shift in patch test utilization. An analysis of Medicare Part B fee-for-service claims for PT between 2010 and 2018 demonstrated that an increase in patch test utilization during this period was driven mainly by nonphysician providers and allergists.[26] From 2012 to 2017, the number of patients patch tested by allergists grew by 20.3% compared to only 1.84% for dermatologists.[27] Since dupilumab was approved in 2017 for the management of moderate to severe atopic dermatitis, claims data from 2017 to 2022 showed an exponential increase in its utilization, while patch test utilization has markedly decreased.[28]

Dermatologists are the predominant experts in ACD, but these concerning trends suggest decreasing utilization of PT by dermatologists, possibly due to lack of required residency training in PT, cost of patch test allergens and supplies with corresponding static reimbursement rates, staff time and training required for an excellent PT experience, comparative ease of biologic prescription vs the time-intensive process of comprehensive PT, and perceived high barrier of entry into PT. This may limit patient access to high-quality comprehensive PT and more importantly, a chance for our patients to experience resolution of their skin disease.

Final Thoughts

Comprehensive PT is safe, effective, and readily available. Unfettered access to a wide range of allergens improves diagnostic accuracy and quality of life and reduces economic burden from sick leave, job loss, and treatment costs. Patch testing remains the one and only way to identify causative allergens for patients with ACD, and comprehensive PT is the most ideal approach for excellent patient care.

REFERENCES

1. Alinaghi F, Bennike NH, Egeberg A, et al. Prevalence of contact allergy in the general population: a systematic review and meta-analysis. *Contact Dermatitis*. 2019;80:77-85.
2. Lim HW, Collins SAB, Resneck JS, et al. The burden of skin disease in the United States. *J Am Acad Dermatol*. 2017;76:958-972.
3. Weidinger S, Novak N. Hand eczema. *Lancet*. 2024;404:2476-2486.
4. Garg V, Brod B, Gaspari AA. Patch testing: uses, systems, risks /benefits, and its role in managing the patient with contact dermatitis. *Clin Dermatol*. 2021;39:580-590.
5. Rodriguez-Homs LG, Taylor J, Liu B, et al. Patch test practice patterns of members of the American Contact Dermatitis Society. *Dermatitis*. 2020;31:272-275.
6. Schalock PC, Dunnick CA, Nedorost S, et al. American Contact Dermatitis Society Core Allergen Series: 2020 Update. *Dermatitis*. 2020;31:279-282.
7. Schalock PC, Dunnick CA, Nedorost S, et al. American Contact Dermatitis Society Core Allergen Series. *Dermatitis*. 2013;24:7-9.
8. Schalock PC, Dunnick CA, Nedorost S, et al. American Contact Dermatitis Society Core Allergen Series: 2017 Update. *Dermatitis*. 2017;28:141-143.
9. Marks JG, Belsito DV, DeLeo VA, et al. North American Contact Dermatitis Group standard tray patch test results (1992 to 1994). *Am J Contact Dermat*. 1995;6:160-165.
10. Kadyk DL, McCarter K, Achen F, et al. Quality of life in patients with allergic contact dermatitis. *J Am Acad Dermatol*. 2003;49:1037-1048.
11. Dupixent® (dupilumab): pricing and insurance. Sanofi US. Updated June 2025. Accessed January 9, 2026. https://www.dupixent.com/support-savings/cost-insurance
12. Woo PN, Hay IC, Ormerod AD. An audit of the value of patch testing and its effect on quality of life. *Contact Dermatitis*. 2003;48:244-247.
13. Rajagopalan R, Anderson R. Impact of patch testing on dermatology-specific quality of life in patients with allergic contact dermatitis. *Am J Contact Dermat*. 1997;8:215-221.
14. Thomson KF, Wilkinson SM, Sommer S, et al. Eczema: quality of life by body site and the effect of patch testing. *Br J Dermatol*. 2002;146:627-630.
15. Boonchai W, Charoenpipatsin N, Winayanuwattikun W, et al. Assessment of the quality of life (QoL) of patients with dermatitis and the impact of patch testing on QoL: a study of 519 patients diagnosed with dermatitis. *Contact Dermatitis*. 2020;83:182-188.
16. Johnson H, Rao M, Yu J. Improved or not improved, that is the question: patch testing outcomes from the Massachusetts General Hospital. *Contact Dermatitis*. 2024;90:324-327.
17. George SE, Yu J. Patch testing outcomes in children at the Massachusetts General Hospital. *J Am Acad Dermatol*. 2024;91:354-356.
18. McNamara D. Dimethyl fumarate named 2011 allergen of the year. *Int Med News*. February 3, 2011. Accessed January 9, 2026. https://www.mdedge.com/internalmedicine/article/20401/dermatology/dimethyl-fumarate-named-2011-allergen-year
19. Nath N, Reeder M, Atwater AR. Isobornyl acrylate and diabetic devices steal the show for the 2020 American Contact Dermatitis Society allergen of the year. *Cutis*. 2020;105:283-285.
20. Raison-Peyron N, Sasseville D. Acetophenone azine. *Dermatitis*. 2021;32:5-9.
21. Castanedo-Tardana MP, Zug KA. Methylisothiazolinone. *Dermatitis*. 2013;24:2-6.
22. Svedman C, Ale I, Goh CL, et al. Patch testing with nickel sulfate 5.0% traces significantly more contact allergy than 2.5%: a prospective study within the International Contact Dermatitis Research Group. *Dermatitis*. 2022;33:417-420.
23. Houle MC, DeKoven JG, Atwater AR, et al. North American Contact Dermatitis Group Patch Test Results: 2021-2022. *Dermatitis*. 2025;36:464-476.
24. Sundquist BK, Yang B, Pasha MA. Experience in patch testing: a 6-year retrospective review from a single academic allergy practice. *Ann Allergy Asthma Immunol*. 2019;122:502-507.
25. Atwater AR, Liu B, Walsh R, et al. Supplemental patch testing identifies allergens missed by standard screening series. *Dermatitis*. 2024;35:366-372.
26. Ravishankar A, Freese RL, Parsons HM, et al. Trends in patch testing in the Medicare Part B fee-for-service population. *Dermatitis*. 2022;33:129-134.
27. Cheraghlou S, Watsky KL, Cohen JM. Utilization, cost, and provider trends in patch testing among Medicare beneficiaries in the United States from 2012 to 2017. *J Am Acad Dermatol*. 2021;85:1218-1226.
28. Santiago Mangual KP, Rau A, Grant-Kels JM, et al. Increasing use of dupilumab and decreasing use of patch testing in medicare patients from 2017 to 2022: a claims database study. *Dermatitis*. 2025;36:538-540.