# Contact Dermatitis
## Practice Gaps and Challenges

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**KEYWORDS**

• Allergic contact dermatitis • Patch testing • Allergens • Screening allergen series

**KEY POINTS**

- Patch testing remains the criterion standard for diagnosing allergic contact dermatitis.
- Assessing patients for allergic contact dermatitis requires a detailed exposure history, expanded patch testing, 2 patch test readings, and thorough patient education.
- New chemicals are continually being added to the consumer's environment, and as such, physicians must be aware of the possibility of new allergens and test appropriately.
- Patch test screening series need to be updated to identify new allergens that are introduced into the consumer environment.

Patch testing has been the criterion standard for diagnosing allergic contact dermatitis (ACD) since the 1800s. The procedure itself has not changed significantly since it was first introduced. Allergens are placed on the upper back, left in place for 48 hours, removed, read, and reread 72 hours to 1 week later. Although the procedure itself might seem straightforward, patch testing performs best in the hands of those who are most familiar with the process and can maximize its usefulness. The actual application of the testing materials is only part of the procedure; allergen selection, interpretation, and the education of allergen avoidance are all significant components of the patch test procedure and are paramount to the successful management of the patient.

Practice gaps are unfortunately evident in the clinical practice of evaluating the patient suspected of ACD. Some of these practice gaps include the selection of allergens (which is in part dependent on allergen availability), how the testing procedure is performed, and what information is provided to the patient on completion of the test (**Box 1**). In addition, new chemicals are continuously being introduced into the marketplace and workplace, resulting in ongoing consumer exposure of potential new allergens presenting yet another set of challenges. A more recent issue has become the concern over potentially allergenic materials in metal implantable devices and how best to manage these situations. Appropriately evaluating these patients and providing useful information to the patient and referring surgeons is a daunting task.

**Box 1**
**Patch testing practice gaps**

Allergen selection
Patch test procedure
Patient education
Evolution of allergens

The assessment of a patient suspected of ACD begins with a detailed and thorough patient history. The information obtained after this in-depth inquiry leads to allergen selection. Allergen selection presents a practice gap. Dermatologists across the country test to many different baseline screening series as well as to other expanded specialty series (**Box 2**). The decision of which screening series to use can be dependent on several factors, including allergen availability,

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**Box 2**
**Allergen screening series**

- ACDS core allergen series
- European baseline series
- International baseline series
- North American series
- TRUE test
- Speciality or supplemental series ie, flower, shoe etc

cost, and patient history. Studies have shown that the introduction of the US Food and Drug Administration (FDA) -approved preimpregnated allergen system, the thin-layer rapid use epicutaneous test (TRUE) test, has increased the use of patch testing among dermatologists, presumably due to increased ease of use.[1] The number of allergens in the FDA-approved testing series has increased over the years and now has 35 allergens and one control. Although a very good starting point, it can still miss up to 26.7% of allergens because of the limited number of allergens tested.[2] Even expanded series can miss relevant allergens, underscoring the need for a detailed and thorough history of exposures at home and in the workplace, including any potential consort exposures because this history may point to the need for a specialty tray of allergens (ie, dental tray, nail tray).[2] The continual introduction of new chemicals requires that the dermatologist remain vigilant and aware of new potential allergens in the patient's environment and test when appropriate. Not all dermatologists can maintain these expanded series. The practice gap of breadth and depth of allergen testing can be overcome through the understanding that negative testing to 35 allergens does not rule out ACD as a diagnosis and referral to centers with expertise in patch testing, and access to more allergens should be considered.

The influx of novel chemicals in the consumer environment results in the introduction of potential new allergens. This introduction of potential new allergens can lead to another potential practice gap. Not only must we test these new allergens in order to detect them, but also we must first be able to identify these allergens. One recent example was the successful identification of dimethyl fumarate as an allergen in multiple cases of "sofa dermatitis."[3] Several astute dermatologists were able to piece together the puzzle and identify the allergen as dimethyl fumarate, an antifungal, present in small sachets in the furniture.[3] The identification of this allergen closed the knowledge gap that existed and led to a change in usage of this allergen, and as a result, this problem has largely been eliminated.

Another example of industry changes that led to the emergence of new allergens is seen in product preservation. In an ongoing effort to find the best preservative systems available (low cost, low toxicity, long shelf-life, and broad biocidal activity), industries introduce new chemicals into the marketplace. These new preservatives are potential new allergens. One can look to preservative usage databases to see this by the numbers. For example, formaldehyde and quaternium-15 have been widely used preservatives and over time have been found to be significant causes of ACD. As a result, these allergens have become less frequently used in personal care products, and new preservative systems have begun to replace them, demonstrated by corresponding increased usage numbers of these new chemicals.[4] Examples of some of these newer preservative allergens include methylisothiazolinone (MI), the allergen of the year 2013, and iodopropynyl butylcarbamate (IPBC). MI has traditionally been tested to as part of a mix, but in 2005 this chemical was approved as a stand-alone preservative. As a result, we are seeing more allergy to this chemical.[5] MI is not on the TRUE test and therefore can be missed if expanded testing is not performed to the chemical itself. IPBC was previously used as an industrial fungicide but was approved for use in cosmetics in the 1990s. This newer preservative system has been shown to cause ACD from usage in cosmetics.[6] These new chemicals have demonstrated their own ability to sensitize and cause ACD. Neither is on the FDA-approved screening series and would be missed unless they were tested for with expanded trays, highlighting the need for vigilance and awareness of the changing trends in allergen usage over time and the need to periodically update screening series so they remain current and useful in the ability to detect allergens and diagnose ACD.

Another example of industry change that effects consumer allergen exposure is evident in the fragrance arena. In 1977, fragrance mix I was introduced as a screening allergy to identify those allergic to fragrance.[7] This mix underwent its own evolution in order to be most helpful in detecting allergy to fragrance. However, over time, it has become less effective in detecting the newer fragrance chemicals that have entered the marketplace. As a result, fragrance mix II was developed in 2005 to screen for the newer fragrance chemicals.[8] Almost certainly, as more novel fragrances make their way into the marketplace, we will need to appropriately adjust and modify our screening allergens. Already newer fragrance