

Pediatric Baseline Patch Test Series: Pediatric Contact Dermatitis Workgroup

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Background: Allergic contact dermatitis is a challenging diagnostic problem in children. Although epicutaneous patch testing is the diagnostic standard for confirmation of contact sensitization, it is less used in children by dermatologists treating children, pediatric dermatologists, and pediatricians, when compared with adult practitioners.

Objective: The aim of the study was to create and evaluate standardization of a pediatric patch test series for children older than 6 years.

Methods: We surveyed dermatologists and allergists conducting epicutaneous patch testing in children attending the 2017 American Contact Dermatitis Society meeting held in Washington, DC. This was followed by discussion of collected data and consensus review by a pediatric contact dermatitis working group at the conference.

Conclusions: A baseline pediatric patch test panel was established through working group consensus.

Allergic contact dermatitis (ACD), until recently, has been viewed as a condition primarily affecting older individuals who have had lifetime exposure to potentially allergenic haptens and possess mature immune systems. Emerging evidence demonstrates that ACD may be a greater contributor to childhood dermatitis than once believed, with some authors recently estimating that 20% of all dermatitis in children may be secondary to ACD.¹ Several publications have examined the prevalence of ACD in children, with

the largest studies in Canada and the United States coming from the North American Contact Dermatitis Group (NACDG)² and more recently the Pediatric Contact Dermatitis Registry (PCDR).³ Prevalence data of pediatric ACD in Europe are also available from the European Surveillance System on Contact Allergies.⁴

The amount of published data available for pediatric ACD pales in comparison with that available from adult cohorts. For example, from 2005 to 2012, the NACDG patch tested 883 children² compared with 4238 adults tested between 2011 and 2012 alone.⁵ This may reflect referral bias, selection, and access to care. Referral bias may inherently be a reflection of failure to recognize ACD in children by referring dermatologists, by pediatricians, and potentially by parents. The PCDR study demonstrated that although patch testing was performed in children across the United States, most providers patch tested fewer than 10 patients annually.³ Barriers to patch testing mentioned by providers in the PCDR included lack of a Food and Drug Administration–approved patch test kit in young children and an absence of consensus on a pediatric baseline series.³ In this article, we propose an expert consensus–derived baseline patch test series for children older than 6 up to 18 years to be used by physicians caring for children with dermatitis to aid in the diagnosis of ACD.

METHODS

Registered participants of the American Contact Dermatitis Society (ACDS) meeting held in Washington, DC, on November 4 and 5, 2017, were sent a voluntary institutional review board–exempt survey (Partners #2017P002390) hosted on an online portal before the

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conference. The survey listed potential contact allergens that have been reported in children from previous large-scale pediatric ACD studies published by the European Surveillance System on Contact Allergies,⁴ NACDG,^{2,6} and PCDR.³ Participants were queried on which of the listed allergens or potentially unlisted allergens they would include in a baseline series for North American pediatric ACD patients older than 6 years. Allergens receiving more than 60% of the votes were automatically included in the baseline series. Interested members and experts in the field of pediatric ACD were invited to participate in 2 interactive breakout discussions at the meeting. Allergens receiving less than 60% of the votes were discussed for inclusion or exclusion in the series during the meeting.

After the conclusion of the meeting, all participants of the breakout session were sent a follow-up survey using the same online portal. This survey contained all of the allergens that were discussed during the breakout session, and respondents were asked to choose which allergens they would recommend for a pediatric baseline series after having participated in the workgroup discussion. Allergens receiving more than 50% of the votes from attending physicians were included in the North American pediatric baseline series for children older than 6 years.

RESULTS

The premeeting survey was sent to all 100 meeting registrants 2 weeks before the conference. There were 40 respondents (40%) to the survey. Demographics of the respondents are shown in Table 1. Thirty-one respondents were attending physicians, and their responses were included in the analysis. Nine respondents were trainees or nonphysicians, and their responses were excluded. Thirty-one allergens from a list of 102 allergens were chosen by more than 60% of the respondents.

Seventy-two allergens were discussed in detail by the 29 health care providers who attended the session. All attending physicians participating in the breakout session were sent a follow-up survey

and asked to vote for allergens they found to be most relevant in the detection of pediatric ACD. Allergens receiving more than 50% of the votes by full-member physicians were included in the baseline series. Seven additional allergens were included (#32–38). The pediatric baseline series designated by the workgroup is shown in Table 2. Demographic information for participants of the breakout session and responses to the follow-up survey are shown in Table 3.

DISCUSSION

We report the initial findings of the pediatric contact dermatitis workgroup around a pediatric baseline patch test series for children aged 6 to 18 years (Tables 2). This panel includes allergens prevalent in children older than 6 years and reflects published data of North American pediatric ACD reported in the PCDR³ and NACDG.² Although the Thin-Layer Rapid Use Epicutaneous (T.R.U.E.) Patch Test received Food and Drug Administration indications in children aged 6 to 18 years in 2017, to our knowledge, this is the first collaborative and comprehensive pediatric panel in the United States.

It is important to note that the surveillance screen outlined in this report was generated through poll data of the workgroup. Votes for allergens were not weighted by experience of the patch tester in testing children. Notably, the allergens included on this panel represent a baseline screen, a reference point upon which workgroup participants can build their screening set, rather than restrict it. It is expected that the clinicians using this panel would additionally include screening allergens that they deem potentially clinically relevant. For example, during the workgroup discussion, 1 author stated that vitamin E and benzoates are on their standard pediatric panel, and they are prevalent. Because most groups did not test these 2 allergens (poll data), they were not included on the base surveillance screen. This panel represents a starting point, and future published data using this panel will generate the evidence for allergens with true clinical relevance and prevalence in children and serve as an indicator of what should not be tested.

Our goal is to decrease barriers to patch testing in children and increase detection rate of ACD. Practitioners may hesitate to patch test children because of either inexperience in the patch testing of children or fear of sensitization. The collaborative pediatric patch test workgroup panel provides a basis and rationale for practitioners considering patch testing in children. Each allergen in the panel is discussed hereinafter.

Preservatives

Preservatives are found in all cosmetic and personal care products, with a goal to extend shelf life and prevent bacterial, viral, or fungal growth in skin care products, which can become infectious to users. Children are particularly susceptible to such infections because of thinner skin, greater body surface area-to-weight ratios, and weaker skin barriers. Preservatives are also one of the leading causes of ACD in children.

TABLE 1. Demographics of Premeeting Survey Respondents

Total registered participants	100
Total survey responses	40/100 (40%)
Attending physicians	31 (77.5%)
Fellows	3 (7.5%)
Residents	3 (7.5%)
Nonphysicians	3 (7.5%)
Region of practice	30/100 (30%)
Northeast	4 (13.3%)
Mid-Atlantic	7 (23.3%)
Southeast	5 (16.67%)
Midwest	9 (30%)
North Central	1 (3.33%)
South Central	1 (3.33%)
Northwest	0 (0%)
West	3 (10%)

TABLE 2. Pediatric Baseline Series

	Allergens	Responses	% RPPT NACDG	% RPPT PCDR
1	Nickel sulfate	29/29 (100%)	25.6%	13%
2	Quaternium-15	29/29 (100%)	3.2%	2.6%
3	Neomycin	28/29 (96.55%)	6.6%	4.4%
4	Balsam of Peru	28/29 (96.55%)	5.5%	6.5%
5	Fragrance mix 1	28/29 (96.55%)	4.9%	9.4%
6	MCI/MI	28/29 (96.55%)	2.7%	3.1%
7	Bacitracin	27/29 (93.1%)	5.2%	4.6%
8	PG	27/29 (93.1%)	2.2%	5%
9	MI	27/29 (93.1%)	NA	3.6%
10	Fragrance mix II	27/29 (93.1%)	1.9%	3.4%
11	CAPB	26/29 (89.66%)	1.1%	4.6%
12	Cobalt chloride	25/29 (86.21%)	9.1%	4%
13	Formaldehyde	25/29 (86.21%)	2.9%	4.4%
14	Propolis	25/29 (86.21%)	1.7%	1.9%
15	Tixocortol-21-pivalate	25/29 (86.21%)	1.2%	1.8%
16	Hydrocortisone-17-butyrate	25/29 (86.21%)	0.8%	0.5%
17	Diazolidinyl urea	23/29 (79.31%)	1.1%	1.3%
18	DMDM hydantoin	23/29 (79.31%)	0.9%	0.8%
19	Budesonide	23/29 (79.31%)	1.1%	0.5%
20	Carba mix	22/29 (75.86%)	2.7%	1.9%
21	Imidazolidinyl urea	22/29 (75.86%)	0.8%	0.8%
22	Amerchol L101	21/29 (72.41%)	NA	3.5%
23	Compositae mix	21/29 (72.41%)	2.3%	1.8%
24	Cinnamic aldehyde	21/29 (72.41%)	1.4%	1.9%
25	Paraben mix	20/29 (68.97%)	0.9%	0.9%
26	Thiuram mix	20/29 (68.97%)	1.7%	1%
27	Bronopol	19/29 (65.52%)	1.8%	3.4%
28	SQL	19/29 (65.52%)	0.9%	1.2%
29	Colophony	18/29 (62.07%)	1.2%	2.2%
30	<i>p</i> -tert-Butylphenol formaldehyde resin	18/29 (62.07%)	1.0%	1.8%
31	Clobetasol-17-propionate	18/29 (62.07%)	0.3%	0.8%
32	Decyl glucoside	12/15 (80%)	2.3%	NA
33	Iodopropynyl butylcarbamate	12/15 (80%)	0.6%	1.3%
34	Benzophenone-3	11/15 (73.33%)	0.5%	0.1%
35	AA	10/15 (66.67%)	0.3%	1.8%
36	TTO	9/15 (60%)	0.3%	NA
37	Carmine	9/15 (60%)	2.1%	NA
38	Dimethylaminopropylamine	8/15 (53.33%)	1.1%	0.9%

AA indicates amidoamine; DMDM, 1,3-dimethylol-5,5-dimethyl; NA, not available; RPPT, relevant positive patch test.

Formaldehyde and Formaldehyde Releasers

Formaldehyde and its releasers, including quaternium-15, 1,3-dimethylol-5,5-dimethyl hydantoin (DMDM hydantoin), imidazolidinyl urea, diazolidinyl urea, 2-bromo-2-nitropropane-1,3-diol (bronopol), and sodium hydroxymethylglycinate, are broad antimicrobial preservatives used in many over-the-counter cosmetic and personal care products. They are prevalent in children's shampoos,⁷ body washes, wet wipes,⁸ and topical preparations.⁸ In 1 analysis of products used in young infants, formaldehyde and formaldehyde releasers were found in 14.3% of diaper wipes.⁸ Another analysis found that formaldehyde and its releasers were present in 23.7% of products examined that did not list formaldehyde as an ingredient on the label.⁹ A recent study published in 2018 found formaldehyde and its

releasers to be present in 3% of 533 unique personal products marketed for babies and children.¹⁰ Cross-reactivity is common among formaldehyde and its releasers.

Methylchloroisothiazolinone/Methylisothiazolinone

Popular nonformaldehyde preservatives used in children include methylisothiazolinone (MI) and methylchloroisothiazolinone (MCI), both of which are found in wet wipes,¹¹ skin cleansers, detergent,¹² shampoos,⁷ sunscreens, slime, and various additional personal care products. Since its approval in 2005 for use in cosmetics, MI is now a significant source of contact allergy in children, with 3.6% of children having a relevant positive patch test reaction in 1 study.³ Notably, testing with MCI/MI alone may miss 33% to 60% of MI

TABLE 3. Demographics of Working Group Attendees and Follow-up Survey Respondents

Working group attendees at conference	29
Dermatologists	26/29 (89.7%)
Allergists	3/29 (10.3%)
Academic clinicians	19/29 (65.5%)
Professor	9/19 (47.4%)
Associate professor	4/19 (21.1%)
Assistant professor	6/19 (31.6%)
Private practitioners	8/29 (27.6%)
Nonphysician providers	2/29 (6.9%)
Attending physicians responding to follow-up survey	15/29 (51.7%)
No. pediatric patients patch tested annually	
>41	5/15 (33.3%)
Between 21 and 40	2/15 (13.3%)
Between 1 and 20	8/15 (53.3%)
None	0/15 (0%)
Member of the ACDS	15/15 (100%)
Member of the Society of Pediatric Dermatology	6/15 (40%)
Member of the American Academy of Dermatology	15/15 (100%)

allergy, because the concentration of MI in the MCI/MI mix may be insufficient for detection.¹³ Both MCI/MI and MI are included in our pediatric baseline panel for maximal detection of allergy to these preservatives in personal care products.

Parabens

Parabens are the most commonly used preservatives in cosmetic and personal products.¹⁴ They display broad antimicrobial activity against bacteria and fungi. Parabens are generally considered to have low allergenic potential, with clinical relevance of 0.9% of children in 2 studies.^{2,3} In a phenomenon termed the “paraben paradox,” parabens have been found to have a higher allergenic potential in eczematous or inflamed skin. Cases of paraben contact dermatitis have been reported in children as young as 10 months.¹⁵

Iodopropynyl Butylcarbamate

Iodopropynyl butylcarbamate is a preservative found in many leave-on cosmetic products and was the most common potential allergen found in 20.6% of diaper wipes in 1 study.⁸ The relevant positivity rate in children ranges from 0.6% to 1.3%.^{2,3}

Fragrances

Fragrances are common additives in products for infants and children to produce a pleasant “baby-fresh” scent. However, they are also frequent allergens in children and exposure ranges from body spray, perfume/cologne, scented candles, plug-in fragrances, con-nubial dermatitis from caregivers, and various personal products. In children, fragrances are consistently 1 of the top 10 allergens^{2,3} and the second most common allergen in children with atopic dermatitis (AD).¹⁶

There are more than 2800 potentially allergenic fragrances, and there is limited utility in testing all of them. Markers of fragrance allergy include balsam of Peru (*Myroxylon pereirae*) and fragrance mixes I and II; these are capable of detecting 57.6% of patients with

fragrance allergy.^{17,18} Children with fragrance allergy are at risk of developing systemic contact dermatitis to ingested foods, which contain fragrance-related allergens, especially in spices such as cinnamon, vanilla, cloves, and anise.¹⁹ Dietary sources of these allergens include citrus fruits, tomatoes, soft drinks, and various condiments such as ketchup.

Cinnamic Aldehyde

Cinnamic aldehyde is a common balsam of Peru–related fragrance found in various topical products, perfumes, scents, toothpaste, food, and beverages. It imparts a spicy, cinnamon flavoring and is a potential cause of perioral dermatitis in children, and it may lead to systemic contact dermatitis as well.²⁰

Surfactants

Surfactants are important components of detergents, soaps, and shampoos, and allergenicity trends reflect recent increased detection rates. Traditional anionic surfactants, such as sodium lauryl sulfate, cause erythema, irritation, xerosis, and itching through their disruption of the lipid membrane on the skin. Amphoteric (containing both anionic and cationic components) and nonionic surfactants are popular for use in children's shampoos and body washes because of their lower likelihood of causing skin and mucosal irritation.

Cocamidopropyl Betaine

Cocamidopropyl betaine (CAPB) is an amphoteric surfactant naturally sourced from coconut oil and used in various shampoos, bath gels, pet shampoos, and cosmetics. Because of its lower irritancy potential compared with sodium laurel sulfate, CAPB is often found in children's “tear-free” shampoos.²¹ Intermediaries of CAPB synthesis include 3-dimethylaminopropylamine and amidoamine, which are allergenic impurities often included with CAPB, both of which can also lead to ACD in patients who are sensitized to CAPB and therefore are important to include in patch testing.²¹ In 1 study, 4.6% of children had relevant positive reactions to CAPB,³ whereas in another, 4.9% of children younger than 5 years had relevant reactions to CAPB.² Children with AD were 7 times more likely to have a positive reaction to CAPB compared with those without AD.¹⁶

Decyl Glucoside

Alkyl glucosides, which are popular in personal care products marketed for children, are widely used in rinse-off and leave-on personal products because of their diverse functions including serving as nonionic surfactants, cleansers, and emulsifiers. They were previously thought to be relatively hypoallergenic and thus widely used in the cosmetic industry. However, rates of ACD to decyl glucoside have been increasing steadily with reported rates of 2.3% in tested children.²

Natural Ingredients

The common misconception that “natural” ingredients are safer and more hypoallergenic is prevalent among consumers including parents

of children with atopic dermatitis, in part due to aggressive advertising by cosmetic companies. However, naturally derived ingredients are not uncommon potential allergens in children. Naturally derived ingredients not reviewed hereinafter have been reviewed under surfactants (CAPB and decyl glucoside).

Tea Tree Oil

Tea tree oil (TTO) is derived from the Australian tea tree or *Melaleuca alternifolia*. Tea tree oil has documented antimicrobial and anti-inflammatory properties and is therefore used as a “natural” remedy for the treatment of many dermatologic conditions including superficial wounds, acne, eczema, skin infections, warts, and insect bites.²² It is used as an additive in many personal or cosmetic products and represents one of the most common culprits of ACD to essential oils. Allergic contact dermatitis to TTO has been reported in children,²³ and it was deemed a relevant positive reaction in 0.6% of children.² With widespread application in the personal care product industry, TTO is an emerging allergen with increasing prevalence in children.

Propolis

Propolis is a natural resin produced from honeybees and used in a variety of topical medications especially lip balms, homeopathic treatments, and various moisturizers. In recent studies, 1.9% of children aged 0 to 18 years in the PCDR had relevant positive patch test reactions to propolis.³ Propolis is also a marker for fragrance allergy and demonstrates significant cross-reactivity with fragrances because it may include compounds such as cinnamic aldehyde and vanillin.²⁴

Amerchol L101

Lanolin or wool alcohol is derived from sheep sebum and is used extensively in cosmetics and moisturizers as an emulsifier. More than 600 products in the US market currently contain lanolin.²⁵ Studies have found that Amerchol L101, a hydrogenated form of lanolin, is more sensitive in detecting lanolin allergy than lanolin alcohol.²⁵ In 1 series of children with AD in Sweden, 11% had a relevant positive reaction to Amerchol L101 found in emollients, soaps, shampoos, hair conditioners, oils, and hand sanitizers.²⁶ In US studies, 3.5% to 5.1% of children younger than 18 years had relevant positive reactions to Amerchol L101.^{2,3}

Colophony

Colophony (rosin) is a natural substance obtained from the sap of pine trees. It is a tacky substance with a variety of purposes including as an adhesive, in paper products, sportswear, shoes, and various personal cosmetic products. It is also a marker of fragrance allergy with clinically significant cross-reactivity between colophony, propolis, and fragrances.²⁴ The positive patch test rate in children has been reported to be 1.8% to 2.2%.^{2,3}

Carmines

Carmines is a red dye derived from the cochineal insect. It is frequently used in leave-on cosmetic products such as lipstick, as well

as dye in foods such as red velvet cake. Systemic ACD has been reported in children due to carmines in food.²⁷ Carmines was found to be a relevant positive allergen in 2.1% of children.²

Plant-Derived Allergens

The Compositae or Asteraceae family includes tens of thousands of flowering plants frequently used in topical products. This family includes daisies, ragweed, chamomile, chrysanthemum, tansy, feverfew, pyrethrum, and so on. The most common allergens found in these plants are sesquiterpene lactones (SQLs) to which sensitivity can be detected with SQL mix. In addition to SQL mix, compositae mix is also included in our pediatric baseline panel. Compositae mix is composed of 6 common offenders from the Compositae plant family. Testing to both SQL mix and compositae mix increases the sensitivity of detection.²⁸ In 1 study from 2005 to 2012, the prevalence of relevant positive reactions to compositae mix in children was 2.3%, which was a statistically significant increase compared with the rate in children from 2001 to 2004.² The rate of compositae positivity in children was also statistically higher than the rate of compositae positivity seen in adults.² In another study, the rate of compositae positivity was statistically higher in younger children (0–5 years) as compared with older children (6–18 years).³

Rubber Allergens

Rubber products are widely used in pediatric products including as components of toys, shoes, gloves, clothing, and sports equipment.²⁹ There are many potential allergens used in the production of rubber products, including chemical accelerators as well as glues.

Rubber Accelerators

Rubber accelerators are potential allergens found in almost all rubber products. Screening allergens for rubber accelerators include carba mix and thiuram mix. Carba mix was a relevant allergen in 2.7% of children tested, and thiuram mix was found in 1.7% of children in 1 study.²

p-tert-Butylphenol Formaldehyde Resin

p-tert-Butylphenol formaldehyde resin is a widely used rubber adhesive for rubber and leather goods. It can be found in orthopedic braces, sports equipment, neoprene, shoes (particularly tennis shoes and sneakers), temporary tattoos,³⁰ and clothing.^{31,32} The prevalence rate of contact allergy in children has been estimated to be approximately 1.0% to 1.8% in North America.^{2,3}

Metal Allergens

Nickel and cobalt are some of the most common causes of ACD in children. Common sources of exposure include coins, toys, instruments, jewelry, electronics, cell phones, and metal fasteners in clothing.^{33,34} In children with pectus excavatum who are candidates for corrective surgery, exposure to a Nuss bar is another source of potential metal sensitization. It has been determined that preoperative patch testing for existing metal allergy is of value in some patients to

prevent hypersensitivity reactions to implanted nickel-containing stainless steel Nuss bar.³⁵

Topical Antibiotics

Topical medicaments are frequent sources of contact allergy in children. Antibiotics including neomycin and bacitracin are routinely used in the United States for minor scrapes and cuts leading to high sensitization rates. Neomycin has ranked among the top 3 allergens in children for more than a decade.³⁶

Corticosteroids

Topical corticosteroids are frequently used in the management of eczematous dermatitis in children. Infrequently, patients treated with topical steroids may notice paradoxical worsening or lack of improvement in their dermatitis. Corticosteroids are classically divided into 5 chemically related classes A, B, C, D1, and D2, with screening allergens for class A (tixocortol-21-pivalate), class B (budesonide), class D1 (clobetasol-17-propionate), and class D2 (hydrocortisone-17-butyrate) included in our pediatric series. A screening agent for class C corticosteroids, such as desoximetasone, is not represented in our pediatric panel, as the workgroup discussed its uncommon usage pattern in this population and paralleled reduced relevant positive allergen in children.² However, providers who suspect a topical steroid allergy should add desoximetasone to the screening panel for select patients.

Propylene Glycol

Propylene glycol (PG) is used widely in personal care products as a solvent, humectant, antimicrobial, and stabilizer.³⁷ In 1 study, PG was found in 20.6% and 24.4% of diaper wipes and topical diaper preparations, respectively.⁸ Propylene glycol can also be found in various topical steroids, especially those with a cream vehicle, as well as oral medications, including up to 26.1% of antihistamines in 1 study.³⁸ It is consistently identified as a top 10 allergen in children in various studies in North America.^{2,3} Propylene glycol was a relevant allergen in 2.2% of children tested.² The prevalence of PG allergy was higher in children with AD at 5.8% in 1 study.³⁹

Sunscreens

Sunscreens are an important preventive tool in combating the rising incidence of skin cancer in the United States. However, popular ultraviolet (UV) filters such as benzophenone-3 are potential causes of ACD. In a 2011 study, benzophenone-3 was found in 68% of sunscreens assessed, making it the most common UV filter in the United States.⁴⁰ Benzophenones are also used as preservatives in personal care products to prevent photodegradation.⁴¹ In 1 study of 157 children with suspected photodermatitis, benzophenone-3 was the leading cause of photoallergic contact dermatitis.⁴² In the general population with dermatitis, benzophenone-3 was identified as a relevant allergen in 0.5% of children.² Because of the number of UV filters available on the market, it is the recommendation of the

working group that personal sunscreens should be tested in all children suspected of having an ACD to their sunscreen.

CONCLUSIONS

Allergic contact dermatitis is more prevalent in children than once thought. Patch testing remains the criterion standard for diagnosis of contact allergy. This diagnostic test is not performed as often in children when compared with rates of testing in adults. Published herein are the inaugural findings of the ACDS pediatric contact dermatitis workgroup regarding allergen inclusion on a pediatric surveillance patch test panel. The 38 allergens reflected in Table 2 are a minimum number the group recommended be studied in this population. This number specifically leaves 2 vacant spots on the patch test, which serve as an indication to consider “what else” might be relevant, for example, another standard allergen, such as vitamin E or benzoates, a patient's leave-on products or a prescription topical medication, as deemed appropriate for testing by the clinician. Regional variation may also affect the prevalence of certain allergens. This will not only increase the diagnostic yield of patch testing in children but also serve as a method of early detection of new and emerging allergens in children. As a side note, the workgroup experience was that the back of a child aged 6 years can fit 40 to 60 allergens, allowing for expanded testing.

Although there have been US-based prospective studies using the T.R.U.E. Test in children with ACD,⁴³ comprehensive patch testing with standardized allergens in children is often performed based on the commercially available allergen concentrations, testing time frame intervals, and evidence gleaned from experience with adult populations. Workgroup participants acknowledged that further optimization of commercial allergens may be indicated for pediatric use and when testing patients with atopic background, and that further studies are needed to define evidence-based pediatric-centered patch testing.

Just as the causes of ACD in adult populations are a dynamic problem that requires continuous monitoring and revisions to reflect the changes in exposures and allergies that occur over time, the same is true for pediatric ACD. Thus, it is anticipated that evidence-based data gathered from children undergoing patch testing will lead to revisions of the workgroup's initial surveillance panel and establish trends to guide future inclusion and exclusion of patch test allergens.

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