

## RESIDENT COMPETITION RESEARCH ARTICLE

## Management and Referral Patterns in Pediatric Atopic Dermatitis: A Survey of Pediatric Healthcare Professionals

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### ABSTRACT

**Background:** The incidence of pediatric atopic dermatitis (AD) has continued to increase worldwide and pediatric healthcare providers (PHPs) are typically the initial healthcare provider tasked with management of this disease. The consequences of inadequately managed AD and misdiagnosed food allergies are devastating for patients and their families, and the financial burden associated with these scenarios can be overwhelming.

**Objective:** To assess the management and referral patterns of pediatric AD patients by PHPs in the Jacksonville, Florida (FL) area.

**Methods:** An online electronic survey was distributed to 70 PHPs using SurveyMonkey®. Data was collected over a 6-week period. The survey yielded a sample size of 28.

**Results:** Most participants were physicians (92.8%), with an average of 21.75 years in practice. Just over half (53%) of PHPs were aware of the American Academy of Dermatology (AAD) Guidelines of care for the management of AD. Dermatologists were the initial referral choice for AD management in 2/3, while 1/3 indicated preference for an allergist. Diet alteration was used by 14.3% as an initial AD management step and 35.7% tried elimination diets prior to referral to an allergist. Referral to specialists were low with 75% PHPs referring <25 % of their AD patients to dermatology.

**Conclusion:** With the number of outpatient AD visits increasing amongst PHPs, knowledge of management guidelines, in-depth understanding of appropriate use and limitations of elimination diets and food allergen testing, and referral to specialists suitable for management of this cutaneous disorder are imperative, but found to be highly variable.

### INTRODUCTION

Pediatric atopic dermatitis (AD) is a common dermatological condition, affecting ~13% of pediatric patients.<sup>1</sup> The incidence of

pediatric AD continues to increase worldwide and the consequences of inadequately managing this disease are devastating for the patient, their families, and their financial situation.<sup>2,3</sup> Health-related quality of life (QOL) studies in pediatric

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patients with generalized AD have elucidated the profound effect this disease has on children, with the impact of AD rated only inferior to cerebral palsy, equal to chronic renal disease, and less severe than cystic fibrosis, asthma, and psoriasis.<sup>4</sup>

PHPs are usually the initial healthcare provider tasked with evaluation and management of AD. The annual number of AD visits to PHPs far exceeds the annual number of AD visits to dermatologists; in fact, the number of outpatient AD visits is increasing amongst PCPs, but declining amongst dermatologists.<sup>5</sup> In the course of our clinical practice as dermatologists, we often observe that pediatric AD patients receive a referral to an allergist, prior to a dermatologist, in an attempt to identify “triggers” or “causes” of AD. Alternatively, the patients may not receive a referral to an allergist, but instead, extensive food allergen panels (RAST) are ordered and interpreted by the PHP. This form of standard food allergen panel IgE testing notoriously results in misdiagnosis of food allergies, leading to unjustified cessation of breastfeeding, elimination or restrictive diets, financial burden, and risk of social isolation, nutritional deficiencies, and growth retardation.<sup>6,7</sup>

The AAD, National Institute of Allergy and Infectious disease (NIAID), and American Academy of Allergy, Asthma & Immunology (AAAAI)/American College of Allergy, Asthma & Immunology (ACAAI) Joint Task Force all have specific guidelines for food allergy testing in moderate to severe AD patients less than 5 years old.<sup>8-10</sup> Interestingly, all parties agree that limited food allergy testing should be initiated in patients with persistent AD despite optimized medical management of their dermatosis and/or in patients with a reliable

history of a type 1 hypersensitivity reaction after ingestion of a specific food.<sup>8,9</sup>

This study sought to assess PHPs awareness of the AAD Guidelines of care for the management of AD, initial treatment steps utilized by PHPs for AD treatment, referral preference (allergist vs dermatologist), reasons PHPs order allergen-specific serum IgE (RAST) testing, and the youngest ages they will order such testing in.

## METHODS

The data was collected via an online, anonymous survey, generated through SurveyMonkey©. The survey was dispersed to actively practicing PHPs, including pediatricians, nurse practitioners (NP), and physician assistants (PA) in the greater Jacksonville, FL area via an email link (primary dispersion). The email addresses utilized in primary dispersion were acquired through years of practice and communication with local colleagues. The email body contained general survey information, including discussion of: anonymous nature of the survey, length/time commitment involved in participation, and a disclaimer that further survey submission confirmed consent of participation in the study. Study participants were encouraged to share the survey link with other colleagues actively practicing pediatric medicine (secondary dispersion).

The initial collection goal was 21-30 PHP responses over a 6-week data collection period. The email containing the survey link was dispersed by the primary investigator (PI) on 3 separate occasions over the 6-week period. This study was determined to be exempt from IRB oversight by the Healthcare America (HCA) Institutional

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## RESULTS

The survey was dispersed to ~70 practicing PHPs (primary survey dispersion). Data regarding the number of additional PHPs who may have participated in the survey via secondary survey dispersion is unknown. A total of 31 survey responses were obtained, yielding an estimated response rate of 44.3%.

The initial survey question, “Do you manage the treatment of eczema or atopic dermatitis in pediatric patients?”, was used as an inclusion versus exclusion criteria tool for the study. Participants who answered “Yes” (28), were included in the sample size, while participants who answered “No” (2) or skipped the question (1) were excluded. Physicians accounted for 92.8% (26 PHPs) of participants, while physician extenders, such as NPs (1 = 3.6%) and PAs (0), were poorly represented. One survey participant (1 = 3.6%) did not disclose their job title. The average number of years in practice was 21.75. Over half (16 = 57.1%) of participants completed their residency training (physicians) or graduate school degree (NPs/PAs) in the Southeast. Of the surveyed PHPs, 75% saw between 6-15 patients monthly for evaluation and management of AD (Table 1 and 2).

Just over half of PHPs (15 = 53.6%) reported that their management decisions were reflective of the AAD guidelines

regarding pediatric AD, while 13 (46.4%) indicated they were unaware of the guidelines. For initial management of pediatric AD, optimization of moisturization with emollients (27 = 96.4%), over-the-counter (OTC) topical corticosteroids, such as 1% hydrocortisone (11 = 39.3%), and prescription topical corticosteroids (9 = 32.1%) were the most highly selected options. Other selected initial management options included: empiric diet alteration (4 = 14.3%) and allergy testing (allergen-specific serum IgE or RAST testing) to determine allergy triggers (1 = 3.6%) (Table 3).

Of the 28 PHPs in the study, 11 providers indicated that they order and interpret allergen-specific serum IgE (RAST) testing in their practice. Information regarding the indications for ordering testing and the youngest age groups they order testing in are displayed in Figure 1. PHPs were also queried regarding approximately what percentage of their existing AD patient panel had RAST testing. All survey participants (28) were included in this response analysis as testing may have been performed by another healthcare provider, such as an allergist; the results are as follows: 71.4% (20 PHPs) reported 0-25% of their patients had received testing, 17.9% (5 PHPs) indicated 26-50% had been tested, and 3 (10.7%) selected “N/A”.

Participants were asked which specialist they were most likely to refer their AD patient to for management of their disease, 9 (32.1%) chose Allergy/Immunology, 18 (64.3%) chose Dermatology, one participant selected “Other”, and no participants chose Alternative Medicine. The participant that indicated “Other”, commented that they would choose an allergist for patients <1-

**Table 1.** Job title and geographic training location of PHPs

Job Title	Physician (MD/DO)	Nurse Practitioner	Physician Assistant	Unknown Provider
Number (%)	26 (92.8%)	1 (3.6%)	0	1 (3.6%)
Geographic Location	Northeast	Southeast	Midwest	Pacific
Number (%)	5 (17.9%)	16 (57.1%)	2 (7.1%)	4 (13.3%)

**Table 2.** Monthly number of atopic dermatitis appointments

Atopic Dermatitis Appointments/Month	3-5 Patients/Month	6-10 Patients/Month	11-15 Patients/Month	16+ Patients/Month
Number (%)	4 (14.3%)	13 (46.4%)	8 (28.6%)	3 (10.7%)

**Table 3.** Initial management steps of pediatric healthcare providers for atopic dermatitis

Initial Management for Atopic Dermatitis	Number (%)
<i>Optimize Moisturization with Emollients</i>	27 (96.4%)
<i>Over the Counter Topical Corticosteroids (1% hydrocortisone cream)</i>	11 (39.3%)
<i>Prescription Topical Corticosteroid</i>	9 (32.1%)
<i>Change in Diet (i.e. change formulas, elimination diet for mother and/or baby, encourage breast feeding, etc.)</i>	4 (14.3%)
<i>Allergy Testing (i.e. RAST testing to determine the triggers for the patient)</i>	1 (3.6%)

year-old, but a dermatologist for older children. PHP estimates regarding the percentage of their AD patients that receive a referral to an allergist and/or dermatologist for co-management of their condition are represented in Table 5.

PHPs were also questioned about their most likely “next steps” in management if their current treatment strategies such as, dietary

changes or elimination diets, topical emollients, prescription topical steroid, etc. were not controlling their patient’s AD. Consistent with above responses, referral to a dermatologist was selected by 18 (64.3%), referral to an allergist by 6 (21.4%), increasing to a stronger potency topical steroid by 3 (10.7%), and addition of an oral antihistamine to the regimen by 1 (3.6%). No participants selected addition of an oral antibiotic (0%). Similarly, we also assessed which therapies PHPs trial in AD patients prior to referral to an allergist for more extensive testing and this data is reflected in Table 6.

## DISCUSSION

Although the sample size of participants in the study was small (28), the surveyed PHPs had considerable experience (average years in practice = 21.75), most were physicians, and they managed a fair volume of AD patients, giving further merit to our study. With the role of the PHP becoming increasingly more important in AD management, we were surprised to uncover that just over half (53.6%) of PHPs were aware of the AAD Guidelines of care for management of atopic dermatitis.<sup>5</sup> In accordance with AAD management

guidelines, most participants (96.4%) indicated they optimize moisturization with emollients as part of their initial AD management, but only 75% optimize moisturization prior to referral to an allergist. Regardless of disease severity, all AD patients should receive optimal barrier care with gentle cleanser and regular use of emollients.<sup>10</sup>

In regards to topical corticosteroids, ~40% of PHPs indicated preference for OTC topical steroids, such as 1% hydrocortisone cream, for initial AD management, while ~30% of PHPs chose a prescription strength topical steroid. Inconsistency in opinion on “optimized medical management” of AD is pronounced between PHPs, dermatologists, and other specialists, particularly in regard to topical corticosteroid use, emollient counseling, and use of oral antibiotics.<sup>11,12</sup> Though not queried in the survey, steroid phobia amongst parents may influence the PHPs preference for an OTC recommendation versus a prescription topical corticosteroid. In one study, 72.5% of parents admitted to concerns of utilizing topical corticosteroids on their child’s skin, with steroid-induced atrophy cited as the most common concern (34.5%).<sup>13</sup>

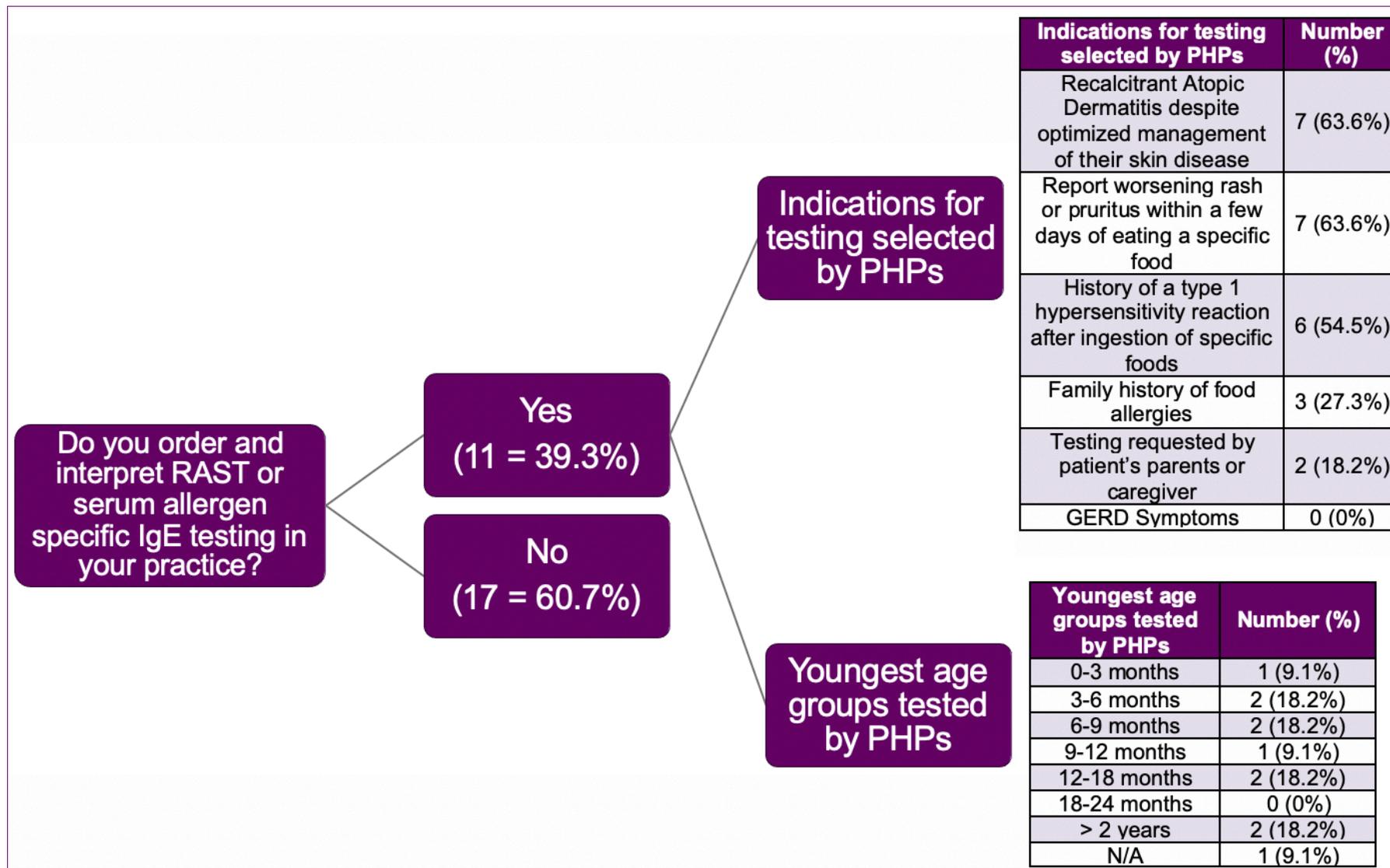
Surprisingly, 35.7% of PHPs tried an empiric elimination diet prior to referral to an allergist and 14.3% of PHPs use diet alteration as one of their initial AD management steps. In regards to AD management, there has also been longstanding difference in opinion amongst PCPs, allergists, and dermatologists regarding the relationship between food allergies and AD.<sup>11,14</sup> In one previous study, food allergy was mentioned as a causative factor for AD during patient counseling by 40% of pediatricians.<sup>11</sup>

Consequently, this diverts the caregiver’s attention towards finding the “cause” of the patient’s AD, rather than managing the disease state. In addition, effective AD therapy has shown to significantly reduce the number of perceived “food reactions” and overall parental concern for food allergy, further validating the AAD recommendations for optimized medical management of AD prior to food allergy workup, either by the PHP or an allergist.<sup>8,15</sup>

Food allergy prevalence has been increasing in the United States and 8% of all children are diagnosed with an allergy to at least one food. Of these children with a food allergy, nearly one-third are diagnosed with multiple food allergies.<sup>16,17</sup> Allergen-specific serum IgE (RAST) is the most frequently ordered test by PHPs for the workup of food allergies, likely due to the ease of ordering and the requirement of only one needle-stick versus skin-prick-testing (SPT) which requires a visit to an allergist and numerous sticks.<sup>18</sup> Although allergen-specific serum IgE testing does have a high sensitivity rate, it also carries a high-false positive rate, leading to diagnosis of “allergies” that are often clinically irrelevant.<sup>6,8,16</sup> The NIAID guidelines specifically state that allergen-specific serum IgE (RAST) testing alone is not sufficient to diagnose a food allergy and the gold standard remains oral food challenge tests.<sup>9</sup> However, we frequently encounter pediatric patients on long-standing dietary restrictions based solely on the results of their allergen-specific serum IgE (RAST) testing, leading to frustration amongst patients, parents, and clinicians.

Approximately 40% of PHPs indicated they order and interpret allergen-specific serum IgE (RAST) testing in their practice.

**Figure 1.** Serum allergen specific IgE (RAST) testing amongst PHPs



**Table 5.** Co-management and referral of pediatric AD patients

<b>% Allergist Referral for Co-Management</b>	<b>0-25%</b>	<b>26-50%</b>	<b>76-100%</b>	<b>76-100%</b>	<b>N/A</b>
<b>Number (%)</b>	23 (82.1%)	3 (10.7%)	1 (3.6%)	0	1 (3.6%)
<b>% Dermatologist Referral for Co-Management</b>	<b>0-25%</b>	<b>26-50%</b>	<b>76-100%</b>	<b>76-100%</b>	<b>N/A</b>
<b>Number (%)</b>	21 (75.0%)	5 (17.8%)	1 (3.6%)	0	1 (3.6%)

Utilization of this test, however, was lower than expected amongst respondents with 71.4% of PHPs indicating that  $\leq 25\%$  of their AD patients had received said testing and 20% of PHPs stating  $\leq 50\%$  of their AD patients had received testing. Another study published in *The Journal of Pediatrics* sought to assess allergen-specific specific IgE testing amongst PHPs and found that in mild AD, testing was ordered in 15.8% of patients and in 60.4% of moderate-to-severe patients.<sup>12</sup> Based on epidemiological studies, approximately 2/3 of AD patients have “mild disease”, where the other 1/3 have “moderate-to-severe disease”.<sup>17</sup> Assuming AD patients in our area follow a similar epidemiological distribution of severity, the frequency of allergen-specific serum IgE (or RAST) testing among our surveyed PHPs would be fairly consistent with those in the aforementioned study.<sup>12,17</sup>

The surveyed PHPs most frequently order allergen-specific serum IgE (RAST) for the following indications: recalcitrant AD despite optimized management of skin disease (63.6%) and history of a type 1 hypersensitivity reaction after ingestion of specific foods (54.5%). Promisingly, this reflects that PHPs are testing for comorbid food allergies as recommended by the AAD, NIAID, and AAAAI/ACAAI Joint Task Force.<sup>8-10</sup> Of more concern though, ~20% of PHPs indicated they would order testing if requested by the patient’s parents or caregiver and ~30% order testing for a patient with a strong family history of food allergies. The two

aforementioned indications are not supported in the literature and may reflect the extraneous pressure placed on PHPs by caregivers. Although allergen-specific serum IgE (RAST) is the preferred initial diagnostic test for food allergy workup, a fair number of PHPs may be ordering these expensive tests for unjustified indications. Previous studies have revealed that this form of unjustified food allergen panel screening yields a positive predictive value of  $\leq 3\%$ .<sup>6</sup>

**Table 6.** Therapies trialed by PHPs prior to allergist referral

<b>Therapies Trialed before Allergist Referral</b>	<b>Number (%)</b>
<i>Prescription Topical Corticosteroid</i>	25 (89.3%)
<i>Gentle Cleansers and Emollients</i>	21 (75.0%)
<i>OTC Topical Corticosteroid</i>	18 (64.3%)
<i>Oral Antihistamine</i>	14 (50.0%)
<i>Elimination Diets</i>	10 (35.7%)
<i>Topical Immunomodulators (e.g. tacrolimus/pimecrolimus)</i>	5 (17.9%)
<i>Topical Crisaborole Ointment</i>	4 (14.3%)
<i>Oral Steroids</i>	1 (3.6%)
<i>Dupilumab</i>	0

Although no published guidelines exist regarding optimal age for allergen-specific serum IgE testing, the utility of testing broad food allergen panels prior to food introduction is believed to be poor.<sup>6</sup> Interestingly, many authors have hypothesized that the origin of IgE antibody development against food

proteins in pediatric AD patients is secondary to percutaneous absorption of food antigens through the dysfunctional cutaneous barrier.<sup>19,20</sup> This further emphasizes the utmost importance of early, aggressive barrier restoration in AD patients to prevent percutaneous sensitization from even occurring.

In regards to referrals for AD management, our data revealed that approximately 2/3 of PHPs select dermatologists as the initial referral, whereas 1/3 chose allergists. With the knowledge that effective and consistent therapy for AD can alleviate food allergy concerns amongst parents, one could make the argument that all AD referrals should initially be to a dermatologist for a trial of optimized medical management.<sup>15</sup> The caveat of this statement involves patients with any evidence of a food-induced type 1 hypersensitivity reaction, patients requiring oral food challenge testing, or in patients with associated comorbidities such as asthma; in these cases, allergy referral is undeniably indicated. Overall, our data suggested referral to specialists was low amongst surveyed PHPs, with 75% of participants indicating  $\leq 25\%$  of their AD patients receive a dermatology referral and 82% indicating  $\leq 25\%$  receive an allergist referral. Saavedra et al found that 52% of mild AD patients and 60% of severe patients receive a referral to a dermatologist, whereas 32% of mild AD patients and 38% of severe patients receive a referral to an allergist. Our data may represent a true referral pattern in our community or a significant source of recall bias in our study.<sup>18</sup>

Several limitations were identified in our study including the small sample size (28), participants were limited largely to the greater Jacksonville, Florida area, and lack of diversity amongst the surveyed PHPs with mostly physicians responding to the survey (92.8%). The lack of responses from NPs and PAs is particularly significant since physician extenders also play a large role in the

management and care of pediatric atopic dermatitis patients. Some of the study participants may have also felt more compelled to complete the survey since they personally knew the researchers involved in the study, which may have increased the sample size. Completion of this study on a broader geographical scale with increased representation of physician extenders may reveal different management and referral patterns in this subset of patients.

## CONCLUSION

A large proportion of AD patients are managed directly by PHPs and knowledge of management guidelines, appropriate use and limitations of allergen-specific serum IgE (RAST) testing, and proper specialist referrals are crucial. Although opinion differs greatly amongst specialists, AD is a cutaneous disease and the role of food allergens in maintenance or flares of this disease is likely minimal.<sup>6,11,12</sup> In the absence of evidence of a type 1 hypersensitivity response, initial referral of AD patients should be to a dermatologist for optimized medical management of AD. The results of this survey highlight multiple misconceptions about AD and its relation to food allergies and provides a true educational opportunity to realign the management decisions of our pediatric colleagues with current recommendations.

**Abbreviations:** FL – Florida, HCA – Healthcare America, AD – atopic dermatitis, PCPs – Primary care providers, PHP – pediatric healthcare provider, AAD – American Academy of Dermatology, RAST – radioallergosorbent testing, QOL – quality of life, NIAID – National Institute of Allergy and Infectious Disease, AAAAI – American Academy of Allergy, Asthma & Immunology, ACAAI – American College of Allergy, Asthma & Immunology, NP – nurse practitioner, PA – physician assistant, PI – primary investigator, IRB – Institutional review board, OTC – over-the-counter, SPT – skin prick testing

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