



**REFERRAL GUIDELINE**

<b>Pulmonology</b>	<b>In Vitro [blood] IgE Allergy Testing (ImmunoCAP®)</b>
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<b>Background</b>	<ul style="list-style-type: none"> <li>• The association between asthma and allergy is well established.</li> <li>• Allergy sensitization is a risk factor for development of asthma in children.</li> <li>• Exposure to allergens in sensitized patients can increase symptoms and lead to exacerbations.</li> <li>• Identifying and managing allergic triggers can significantly improve control.</li> <li>• Identifying allergies may be useful in determining candidates for biologic asthma therapies and immunotherapy (eg Xolair®)</li> <li>• NIH; National Heart Lung Blood Institute; Expert Panel Report 3: <i>Guidelines for the Diagnosis and Management of Asthma</i> recommends evaluating the potential role of allergens in <b>all</b> patients with <i>persistent</i> asthma at <b>every</b> opportunity.</li> <li>• NIH recommends identification and subsequent reduction of exposures to relevant allergens via <b>skin testing or in vitro testing</b>.</li> </ul>		
<b>Initial Evaluation</b>	<p>Consider allergy testing in any child who exhibits signs and symptoms consistent with asthma, allergy rhinitis or other allergic diseases, especially when history supports environmental trigger(s.) (See sample questions below.)</p> <p><b><u>SAMPLE QUESTIONS:</u></b></p> <ul style="list-style-type: none"> <li>• <i>Do nasal, eye, or chest symptoms appear when the patient is in a room where carpets are being or have just been vacuumed?</i> (dust mites, pet dander)</li> <li>• <i>Do nasal or chest symptoms improve when the patient is away from home for a week or longer?</i> (dust mites, pet dander)</li> <li>• <i>Do the patient's symptoms become worse during the first 24 hours after returning home?</i> (dust mites, pet dander)</li> <li>• <i>Does making a bed cause nasal or chest symptoms in the patient?</i> (dust mites)</li> <li>• <i>Does the patient sneeze repeatedly in the morning?</i> (dust mites)</li> <li>• <i>Do nasal, eye, or chest symptoms appear when the patient is in damp or moldy rooms, such as basements?</i> (molds)</li> <li>• <i>Is asthma or nasal symptoms worse in a specific season or at a time when the patient has hay fever symptoms in spring, summer, fall, or parts of the growing season?</i> (pollen)</li> </ul>		
<b>Initial Management</b>	<ul style="list-style-type: none"> <li>• Provocation/challenge testing is the gold standard (not skin testing)</li> <li>• Significant correlation between ImmunoCAP and skin testing</li> <li>• ImmunoCAP results that are different from skin testing is not suggestive of a false positive/negative</li> </ul> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> <p><b><u>Skin Testing</u></b></p> <ul style="list-style-type: none"> <li>• Cheaper (not including cost of allergy consultation)</li> <li>• Results Available in 1 hr</li> <li>• Visible results may be more impactful</li> </ul> </td> <td style="width: 50%; padding: 5px;"> <p><b><u>ImmunoCAP</u></b></p> <ul style="list-style-type: none"> <li>• Does not require knowledge, capability, supplies for skin testing</li> <li>• No medication wash out</li> <li>• No risk for systemic reaction</li> <li>• Extensive eczema or other skin is not a contraindication</li> <li>• Safe in Pregnancy</li> <li>• Uncooperative patients may tolerating one "stick" over many</li> <li>• Safe for high risk anaphylaxis patients</li> </ul> </td> </tr> </table>	<p><b><u>Skin Testing</u></b></p> <ul style="list-style-type: none"> <li>• Cheaper (not including cost of allergy consultation)</li> <li>• Results Available in 1 hr</li> <li>• Visible results may be more impactful</li> </ul>	<p><b><u>ImmunoCAP</u></b></p> <ul style="list-style-type: none"> <li>• Does not require knowledge, capability, supplies for skin testing</li> <li>• No medication wash out</li> <li>• No risk for systemic reaction</li> <li>• Extensive eczema or other skin is not a contraindication</li> <li>• Safe in Pregnancy</li> <li>• Uncooperative patients may tolerating one "stick" over many</li> <li>• Safe for high risk anaphylaxis patients</li> </ul>
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<b>When to Refer</b>	<p>TESTING FOR ALLERGY DOES NOT NECESSARILY REQUIRE REFERRAL TO A SPECIALIST</p> <p>*Referral for consultation to a specialist for asthma care (usually, a fellowship-trained allergist or pulmonologist; occasionally, other physicians who have expertise in asthma management, developed through additional training and experience) when;</p> <ul style="list-style-type: none"> <li>• Patient has had a life-threatening asthma exacerbation.</li> </ul>		



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### Pulmonology

### In Vitro [blood] IgE Allergy Testing (ImmunoCAP®)

	<ul style="list-style-type: none"> <li>• Patient is not meeting the goals of asthma therapy after 3–6 months of treatment. An earlier referral or consultation is appropriate if the physician concludes that the patient is unresponsive to therapy.</li> <li>• Signs and symptoms are atypical, or there are problems in differential diagnosis.</li> <li>• Other conditions complicate asthma or its diagnosis (e.g., sinusitis, nasal polyps, aspergillosis, severe rhinitis, VCD, GERD, COPD).</li> <li>• Additional diagnostic testing is indicated (e.g., allergy skin testing, rhinoscopy, complete pulmonary function studies, provocative challenge, bronchoscopy).</li> <li>• Patient requires additional education and guidance on complications of therapy, problems with adherence, or allergen avoidance.</li> <li>• Patient is being considered for immunotherapy. (allergy referral)</li> <li>• Patient requires step 4 care or higher (step 3 for children 0–4 years of age). Consider referral if patient requires step 3 care (step 2 for children 0–4 years of age). Patient has required more than two bursts of oral corticosteroids in 1 year or has an exacerbation requiring hospitalization.</li> <li>• Patient requires confirmation of a history that suggests that an occupational or environmental inhalant or ingested substance is provoking or contributing to asthma.</li> </ul> <p>* Obtained from Full Report of EPR 3 Guidelines on Asthma. <a href="http://www.nhlbi.nih.gov/health-pro/guidelines/current/asthma-guidelines/full-report">http://www.nhlbi.nih.gov/health-pro/guidelines/current/asthma-guidelines/full-report</a></p>			
<p><b>Pre-Visit Work Up</b></p>	<p><b>Labs for submitting ImmunoCAP (all three are very similar; ARUP and LabCorp includes Total IgE)</b></p> <table border="1" data-bbox="284 997 1492 1724"> <tr> <td data-bbox="284 997 673 1724"> <p><b>ARUP</b> - Allergens, Respiratory Panel, Region 2, Mid-Atlantic (DE, MD, VA, DC, NC) IgE (In Cerner test called “Allergy Resp Profile, Mid-Atlantic”) <a href="http://ltd.aruplab.com/Tests/Pub/2005718">http://ltd.aruplab.com/Tests/Pub/2005718</a> Allergens included in this panel: Alternaria alternata (tenuis), Aspergillus fumigatus, Bermuda Grass, Birch Tree, Box Elder/Maple Tree, Cat Dander, Cockroach (German), Common Short Ragweed, Cottonwood Tree, D. pteronyssinus (mites), D. farinae (mites), Dog Dander, Elm Tree, Hormodendrum (Cladosporium), Johnson Grass, <b>Milk (Cow's)</b>, Mouse Epithelium, Mountain Cedar (Juniper) Tree, <b>Mucor racemosus</b>, Oak Tree, , Pecan Tree, Penicillium notatum, Pigweed, Sheep Sorrel (Dock), thy Grass, White Mulberry Tree, and <b>IgE Serum Total</b>.</p> </td> <td data-bbox="673 997 1112 1724"> <p><b>QUEST</b> - Respiratory Allergy Profile Region II: DC, DE, MD, NC, VA <a href="http://www.questdiagnostics.com/testcenter/TestDetail.action?ntc=10644">http://www.questdiagnostics.com/testcenter/TestDetail.action?ntc=10644</a> Allergens included in this panel: Alternaria alternata, Aspergillus fumigatus, Bermuda grass (Cynodon dactylon,) Birch (Betula verrucosa Cat,)dander, Cladosporium herbarum (Hormodendrum,) Cockroach, Common ragweed (Ambrosia elatior) Cottonwood (Populus deltoids,) Dermatophagoides farina, Dermatophagoides pteronyssinus (d1) Dog dander, Elm (Ulmus americana) (t8) Johnson grass (Sorghum halepense,) Maple (box elder) (Acer negindo,)Mountain cedar (Juniperus sabinoides,) Mouse Urine Proteins, Mulberry, Oak (Quercus alba,) Pecan/Hickory (Carya pecan,) Penicillium notatum, Rough pigweed (Amaranthus retroflexus,) Sheep sorrel (Rumex acetosella,) Timothy grass (Phleum pratense)</p> </td> <td data-bbox="1112 997 1492 1724"> <p><b>LabCorp</b> - Allergen Profile With Total IgE, Respiratory–Area 2” Test 602628. <a href="https://www.labcorp.com/test-menu/19391/allergen-profile-with-total-ige-respiratory%E2%88%92area-2">https://www.labcorp.com/test-menu/19391/allergen-profile-with-total-ige-respiratory%E2%88%92area-2</a> Allergens included in this panel: Alternaria alternata; 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<p><b>Co-management Strategy (as appropriate)</b></p>	<p><b>Specialist scope of care</b> Coordinate follow up and further testing as indicated.</p>	<p><b>Primary care scope of care</b> Allergy Testing as above</p>		



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<b>Return to Primary Care Endpoint</b>	<p>Many patients with allergies can be managed at PCP office.</p> <p>Patients evaluated by an asthma specialist typically referred back when asthma is intermittent or well controlled on low dose therapy.</p>
<b>Guideline References</b>	<p>References that address accuracy of in vitro IgE blood testing and comparison to skin testing</p> <ol style="list-style-type: none"> <li>1. <a href="#">Kam KL, Comparison of Three In vitro Assays of serum IgE with skin testing in asthmatic children Ann Allergy 1994;73: 329-336</a></li> <li>2. <a href="#">Kelso JM, Diagnostic Performance of Phadebas RAST, modified RAST and Pharmacia CAP system vs skin testing Ann Allergy 1991; 67 511-514</a></li> <li>3. <a href="#">Boccagni P et al Comparison of four in vitro assays for specific IgE detection In J Clin Lab Res 1994; 24: 102-105</a></li> <li>4. <a href="#">Pastorello et al Studies on the relationship between the level of specific IgE antibodies and the clinical expression of allergy: I. Definition of levels distinguishing patients with symptomatic from patients with asymptomatic allergy to common aeroallergens J ALLERGY CLIN IMMUNOL 1995;96: 580-7.</a></li> <li>5. <a href="#">Simpson A et al. Asthma diagnosis and treatment. J Allergy Clin Immunol 2005;116:744-749.</a></li> <li>6. <a href="#">Gendo K and Larson E Evidence-Based Strategies for Evaluating Suspected Allergic Rhinitis Ann Intern Med. 2004;140:278-289.</a></li> <li>7. <a href="#">Ferastraoar u et al. Diagnosing environmental allergies: Comparison of skin-prick, intradermal, and serum specific immunoglobulin E testing. Allergy Rhinol (Providence).2017 Jun 1;8(2):53-62</a></li> <li>8. <a href="#">Kumar R et al. A Comparative Study of Skin Prick Test versus Serum-Specific IgE Measurement in Indian Patients with Bronchial Asthma and Allergic Rhinitis. Indian J Chest Dis Allied Sci. 2015 Apr-Jun;57(2):81-5.</a></li> <li>9. <a href="#">Asha'ari ZA et al Comparison of serum specific IgE with skin prick test in the diagnosis of allergy in Malaysia. Med J Malaysia. 2011 Aug;66(3):202-6.</a></li> <li>10. <a href="#">de Vos G. Skin testing versus serum-specific IgE testing: which is better for diagnosing aeroallergen sensitization and predicting clinical allergy? Curr Allergy Asthma Rep 2014 May;14(5):430.</a></li> <li>11. <a href="#">Cox L. Overview of serological-specific IgE antibody testing in children. Curr Allergy Asthma Rep. 2011 Dec;11(6):447-53</a></li> </ol>
<b>Miscellaneous</b>	<p>To assist parents/guardian in interpreting ImmunoCAP results consider the following verbiage;</p> <ul style="list-style-type: none"> <li>• Blood allergy testing (called “ ImmunoCAP”) provides insight as to what your child is or will be allergic to. The panel tests for common molds, tree pollen, grass pollen, weed pollen, cats, dogs and dust mites. The results to each individual allergen are reported as a level (or “class” number) from 0 to 6. <b>The higher the result the more likely your child is or will be allergic to something but does not necessarily predict the severity of the allergic symptoms.</b> Class 0 to 1 tend are consistent with low likelihood of allergy while values 4, 5 and 6 are suggestive of significant allergy.</li> <li>• Based on your child’s results it appears that he/she may be allergic to _</li> <li>• Based on your child’s results it appears that he/she is likely <u>not</u> allergic to _</li> <li>• It is also important to consider that allergies can change over time such that they can appear at different ages while other allergies can spontaneously decrease or disappear in time.</li> <li>• I have included some suggestions for allergy avoidance or allergy minimization for those allergens that are likely the most problematic.</li> </ul>



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### **ALLERGY AVOIDANCE MEASURES**

#### **POLLEN**

- Keep windows and doors closed
- Use the air conditioning, change filters often
- Avoid using the attic fan to draw in outside air
- Minimize outside activities (if necessary) during high pollen times/days especially in the morning
- Dry clothes in dryer (not outside clothesline)
- Wash/Bath after exposure outside

#### **DUST MITES**

- Must encase mattresses and pillows for every bed/pillow that he/she sleeps on
- Wash bedding once a week in hot water (>130F) (Of note, AAP recommends setting water heater to less than 130 F to decrease the risk for burns)
- Remove fabric materials including stuffed animals when possible. Alternatively, stuffed animals can be washed in hot water as described above or placed in freezer X 24 hrs once a week
- Remove rug when feasible. If not removed, vacuum rugs regularly.
- Keep humidity low (no humidifiers, run the AC)

#### **MOLDS**

- Avoid damp areas like “musty” basements
- Do not let moisture or dampness accumulate such as in a wet pile of clothes
- Address any water damage in the home
- Keep humidity less than 50%
- Avoid leaf raking, cutting grass, gardening when possible
- Clean moldy surfaces with a cleaner with bleach in it.

#### **PETS (ANIMAL DANDER)**

- Find a new home for the pet and possible and feasible
- Keep pets out of bedroom (or even better, out of the house)
- If possible remove carpets and cloths in those areas where the pet lives
- Limit exposure to pet
- Bath pets once a week if feasible
- Regular vacuuming.

#### **COCKROACHES**

- Use insecticides
- Encase food supplies (never leave food out.)