Achieving Optimal Outcomes for the Asthmatic Patient –
Addressing Disparities by Utilizing the Entire Healthcare Team

Gary Falcetano, PA-C, AE-C
Clinical Educator
gary@falcetano.com
609-577-5351
It is my obligation to disclose to you (the audience) that I am an employee of Thermo Fisher Scientific, maker of the ImmunoCAP Specific IgE in vitro diagnostic test. However, I acknowledge that today’s activity is certified for CE credit and thus cannot be promotional. I will give a balanced presentation using the best available evidence to support my conclusions and recommendations. I do not intend to discuss an unapproved or investigative use of a commercial product in my presentation.
• 1. Describe the current burden of asthma in the US.

• 2. Understand and utilize current NIH guidelines concerning asthma and allergic disease.

• 3. Explore non-traditional approaches to implementing guidelines to encourage adoption that is more widespread, and that helps in addressing disparities of care.

• 4. Understand specific IgE blood allergy testing including advantages, disadvantages and interpretation.

• 5. Describe how Targeted Exposure Reduction (TER) can decrease symptoms and enhance pharmacologic management of asthma.

• 6. Understand the clinical and economic value of primary care adoption of evidenced based guidelines to improve patient care and optimize appropriate specialist referral.
Asthma: Clinical and Economic Burden

1 in 12
18.9 million adults
7.1 million children

4.3M
Increase in the asthma population from 2001-09

2.1M
Annual ER visits

$3,300
Annual cost per person (medical expenses)

479K
Annual hospitalizations

14.2M
Lost work days

$50B
Annual direct costs of care

• Most patients with asthma are managed by primary care

• Asthma prevalence rate among blacks was 47% greater than among whites in 2011
• Asthma attack prevalence rate in blacks is 45% higher than the rate in whites
• Asthma in Latinos
  o Puerto Ricans are twice as likely as non-Hispanic Whites to be diagnosed with asthma (15.7% vs. 7.5% of children and adults diagnosed with asthma)
  o Mexican immigrants by contrast have some of the lowest rates of diagnosed asthma.
• Prevalence is greater in boys than girls, but greater in women than men
Asthma Prevalence by Age in U.S.


Luchando por el Aire: The Burden of Asthma in Hispanics ©2011

CURRENT PREVALENCE RATE PER 1,000

<table>
<thead>
<tr>
<th>Age</th>
<th>Prevalence Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 5</td>
<td>68.5</td>
</tr>
<tr>
<td>5-17</td>
<td>105.5</td>
</tr>
<tr>
<td>&lt;18</td>
<td>94.9</td>
</tr>
<tr>
<td>18-44</td>
<td>79.9</td>
</tr>
<tr>
<td>45-64</td>
<td>86.7</td>
</tr>
<tr>
<td>65+</td>
<td>79.4</td>
</tr>
</tbody>
</table>
Health disparities are pervasive in the United States. Health and health care disparities are the differences or gaps in health (e.g., life expectancy, morbidity, risk factors, and quality of life) and health care access and quality between segments of the United States population as related to race/ethnicity and socioeconomic status (e.g., income, education). Multiple factors are associated with such disparities in asthma management and education.
Asthma Disparities – Specifically….

- HEALTH CARE ACCESS AND QUALITY
- ASTHMA EDUCATION
- ENVIRONMENT

Disparities in Asthma Care, Management, and Education Among Children With Asthma
Holsey, Chanda N. DrPH, MPH, AE-C†; Collins, Pamela MPA, MSA†; Zahran, Hatice S. MD, MPH†

Clinical Pulmonary Medicine: July 2013 - Volume 20 - Issue 4 - p 172–177
doi: 10.1097/CPM.0b013e3182991146
Breathmobile
Guideline-Based Care Improves Care and Reduces Cost

- Pre- vs. Post-year Comparison of ER Visits

```
```
Guideline-Based Care Improves Care and Reduces Cost

- Pre- vs. Post-Year Comparison of Hospitalizations

Core Components of Asthma Care

Core Components of Asthma Care

• 1176 Persistent Asthmatics (285 children, 211 tweens, and 680 adults)
• 16 Family Medicine and 6 Pediatric practices across the United States
• Adherence was highest for prescription of medications (88.0% for short-acting b-agonists and 70.4% for maintenance medications)
<table>
<thead>
<tr>
<th>Elements of the guidelines assessed and documented</th>
<th>Adherence, No. (%)&lt;sup&gt;a&lt;/sup&gt;</th>
<th>P value for difference across age groups, adjusting for site using random-effects model</th>
</tr>
</thead>
<tbody>
<tr>
<td>All (N=1176)</td>
<td>176 (15.0)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Children (5-11 years old)</td>
<td>63 (22.1)</td>
<td>.03</td>
</tr>
<tr>
<td>Tweens (12-18 years old)</td>
<td>34 (16.1)</td>
<td></td>
</tr>
<tr>
<td>Adults (19-65 years old)</td>
<td>79 (11.6)</td>
<td></td>
</tr>
<tr>
<td>Validated tool used</td>
<td>88 (7.5)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Asthma medication adherence discussed</td>
<td>390 (33.2)</td>
<td>.71</td>
</tr>
<tr>
<td>Inhaler technique</td>
<td>89 (7.6)</td>
<td>.002</td>
</tr>
<tr>
<td>Taught</td>
<td>40 (14.0)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Observed</td>
<td>15 (1.3)</td>
<td>.02</td>
</tr>
<tr>
<td>Trigger/impartial</td>
<td>382 (32.5)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Allergies discussed</td>
<td>123 (43.2)</td>
<td>&gt;.002</td>
</tr>
<tr>
<td>Allergy testing</td>
<td>24 (2.0)</td>
<td>.12</td>
</tr>
<tr>
<td>Patient smoking status</td>
<td>681 (76.3&lt;sup&gt;c&lt;/sup&gt;)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Others smoking in home</td>
<td>221 (18.8)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Asthma action plan</td>
<td>37 (3.1)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>NA = not applicable.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NA = not applicable.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Overall, 9.1% of children, 10.9% of adolescents, and 11.2% of adults who were enrolled had no asthma visits in the baseline year.

<sup>c</sup>This percentage is of only tweens and adults in whom smoking status was assessed.
• Conclusion and Relevance: Adherence to asthma guidelines is poor in primary care practices, leaving many opportunities for improvement.
Asthma Workflow

- Asthma Control Test
- Spirometry
- History and physical exam
Asthma Workflow

- Identify Non-Allergic Triggers
- Allergic Trigger Identification with testing
- Review of specific IgE test results
Asthma Workflow

- Medication review
- Complete Asthma Action Plan
• Review of proper medication usage/techniques
• Environmental interventions and progress
• Self-Management skills
Over 60% of adult patients with asthma

Original Research Article Annals of Allergy, Asthma & Immunology, Volume 110, Issue 4, April 2013, Pages 247-252
Image retrieved from: https://www.hopepaige.com/how-to-properly-use-your-asthma-inhaler.aspx
Allergic Asthma

up to 90% of pediatric patients with asthma\(^1\)


Image retrieved from: https://www.hopepaige.com/how-to-properly-use-your-asthma-inhaler.aspx
Stepwise Approach for Managing Asthma

Environmental Controls

- Indicated across all levels of severity

Allergy Testing

- Indicated for at least patients with persistent asthma
- Skin or *in vitro* tests may be used
- Category A evidence

✓ No interference from allergy medications
✓ One blood draw any time of day
✓ For adults and children 3 months old or older with allergy-like symptoms
✓ Lab-designed profiles
  • Respiratory profile

1. Data on file
Cumulative Effect of Asthma Triggers\(^1,2\)

1. Fromer, L. J Family Pract 2004; April: S3-S14
Reducing Exposure to Allergens Reduces Symptoms\textsuperscript{1,2}

1. Fromer, L. J Family Pract 2004; April: S3-S14
Case Studies
Case Study:
12 Year Old Male – Multiple Asthma Exacerbations
School Based Health Clinic
12 y/o male

Presentation – August 20, 2017
12 year old African American, inner city, Medicaid patient. History of seasonal allergies which exacerbates asthma. Had two recent ED visits. Had to quit playing sports due to complications with asthma while under primary care supervision.

ACT Score = 11

Past Medical History
- Asthma
- Seasonal Allergic Rhinitis…exacerbate asthma
- Several ED visits and multiple unscheduled office visits

Meds
- Fluticasone propionate (Flovent) 1 Inh BID
- Albuterol prn
- Cetirizine prn
Physical Exam

- Spirometry Obstructive Pattern – FEV1 Below Predicted
- VSS, NAD
- HEENT: Pale, swollen nasal mucosa, Dennie’s lines
- Lungs: Clear to Auscultation w/prolonged expiration
- Skin: Clear

Now what?
Asthma Champs Overview:

NIH Guidelines based care:
- ACT
- PFT
- Region 5 Respiratory Profile for all persistent asthmatics
- Pharmacologic therapy
- Patient Education on asthma action plan including TER sheet
- Home Health visits based on positive allergy test to indoor allergens
- City Sanitarian visit based off of home health needs assessment
<table>
<thead>
<tr>
<th>levels of specific IgG</th>
<th>class description</th>
<th>units</th>
<th>reference interval</th>
<th>lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.10 - 0.30</td>
<td>negative</td>
<td>mg/dL</td>
<td>0 - 200</td>
<td>02</td>
</tr>
<tr>
<td>0.31 - 0.50</td>
<td>very low</td>
<td>mg/dL</td>
<td>0 - 200</td>
<td>02</td>
</tr>
<tr>
<td>0.51 - 1.00</td>
<td>low</td>
<td>mg/dL</td>
<td>0 - 200</td>
<td>02</td>
</tr>
<tr>
<td>1.01 - 1.50</td>
<td>moderate</td>
<td>mg/dL</td>
<td>0 - 200</td>
<td>02</td>
</tr>
<tr>
<td>1.51 - 2.00</td>
<td>high</td>
<td>mg/dL</td>
<td>0 - 200</td>
<td>02</td>
</tr>
<tr>
<td>2.01 - 3.00</td>
<td>very high</td>
<td>mg/dL</td>
<td>0 - 200</td>
<td>02</td>
</tr>
</tbody>
</table>

**Immunoglobulin E, Total**

<table>
<thead>
<tr>
<th>levels of specific IgG</th>
<th>class description</th>
<th>units</th>
<th>reference interval</th>
<th>lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.21</td>
<td>normal</td>
<td>IU/mL</td>
<td>0 - 200</td>
<td>02</td>
</tr>
<tr>
<td>0.31</td>
<td>low</td>
<td>IU/mL</td>
<td>0 - 200</td>
<td>02</td>
</tr>
<tr>
<td>0.41</td>
<td>moderate</td>
<td>IU/mL</td>
<td>0 - 200</td>
<td>02</td>
</tr>
<tr>
<td>0.51</td>
<td>high</td>
<td>IU/mL</td>
<td>0 - 200</td>
<td>02</td>
</tr>
<tr>
<td>0.61</td>
<td>very high</td>
<td>IU/mL</td>
<td>0 - 200</td>
<td>02</td>
</tr>
</tbody>
</table>

**IgE to Aspergillus fumigatus**

<table>
<thead>
<tr>
<th>levels of specific IgG</th>
<th>class description</th>
<th>units</th>
<th>reference interval</th>
<th>lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.48</td>
<td>normal</td>
<td>IU/mL</td>
<td>0 - 200</td>
<td>02</td>
</tr>
</tbody>
</table>

**IgE to Alternaria alternata**

<table>
<thead>
<tr>
<th>levels of specific IgG</th>
<th>class description</th>
<th>units</th>
<th>reference interval</th>
<th>lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.66</td>
<td>normal</td>
<td>IU/mL</td>
<td>0 - 200</td>
<td>02</td>
</tr>
</tbody>
</table>

**IgE to Black Mold**

<table>
<thead>
<tr>
<th>levels of specific IgG</th>
<th>class description</th>
<th>units</th>
<th>reference interval</th>
<th>lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>18.20</td>
<td>normal</td>
<td>IU/mL</td>
<td>0 - 200</td>
<td>02</td>
</tr>
</tbody>
</table>

**IgE to Common Allergy Mix**

<table>
<thead>
<tr>
<th>levels of specific IgG</th>
<th>class description</th>
<th>units</th>
<th>reference interval</th>
<th>lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.15</td>
<td>normal</td>
<td>IU/mL</td>
<td>0 - 200</td>
<td>02</td>
</tr>
</tbody>
</table>
Reduce Exposure to Your Allergic Triggers

The things that you are allergic to really add up

Discover the connection

Specific IgE blood testing helps to identify your allergic triggers so you and your doctor can develop a plan to reduce your exposure to those allergens to which you are sensitized.

If you are allergic to pollen, that might not be the only reason you are sneezing, and if you have asthma that might not be the only reason you are wheezing. It may be because you are sensitive to more than one allergen. Allergens often add up and can cause you to sneeze, wheeze or get a runny nose.

To stay symptom free, you need to stay under your threshold. Every person has a different level at which they show symptoms. Until the level is reached, they are not affected. When that level is crossed however, the combination of allergens turns into symptoms.
Reduce Exposure to Your Allergic Triggers

House dust mites
Dust mites are microscopic creatures that live in dust and feed on dead skin flakes.

- Encourage motorists, pillows, and box springs in allergen-proof coverings
- Wash bedding weekly in 130°F hot water
- Keep house clean by regularly removing and reducing clutter
- Wear an appropriate mask while cleaning and ask a helper
- 20 minutes after cleaning
- Change furnace and air conditioner filters
- Use a dehumidifier to reduce the humidity in your home

Cockroaches
Cockroaches, vacation, and large pets are the reason for a homeowner.

- Check your cleaning, vacuum, and DDT-resistant or carbamate-resistant insecticides
- Don’t store paper, food, or whole or cut meats in your basement
- Kick out the use of insecticides
- Use a professional pest control services
- Keep rocks and other non-insecticides

Molds (indoor)
Molds live both indoors and outdoors. They give off spores that may cause allergic reactions throughout the year.

- Identify and clean moldy areas with fungicide or bleach
- Use a dehumidifier to reduce the humidity in your home
- Fix water leaks
- Clean furnace filters, refrigerators, and dehumidifiers
- Thoroughly dry clothes before storing

Pollens
Pollens are the tiny pollen particles given off by flowering plants, and grasses. They are a common cause of seasonal allergies.

- Wear a filtering mask, eyeglasses, and adhesive tape
- Remove work clothes outdoors after working outside and before going inside
- Take allergy medicines 30 minutes before going outdoors
- Stay indoors when pollen counts are high for people who are allergic to them
- Check allergen levels, forecasts, or pollen counts
- Use weather websites
- Have someone else do your yard work, or wear a respirator
- At home and when driving, keep windows closed and when possible, use an air conditioner on recirculate and keep windows and doors closed

Molds (Outdoor)
Molds are airborne mold spores present in the air everywhere.

- Avoid mowing grass, handling mud, compost, or raking leaves
- Avoid using lawn that dry outside in windy weather, and use an air conditioner on recirculate and keep windows and doors closed

If specific IgE sensitization is not detected, your doctor may consider the following:

- Cigarette smoke
- Paint-cleaning agents
- Air pollution
- Temperature changes
- Infection
- Aerosol sprays

References:
- Environmental Management

631939
35
Clinical Diagnosis

- Moderate Persistent Allergic Asthma
- Allergic Rhinitis

Treatment –

- Increase fluticasone propionate (Flovent) 2 Inh. BID
- Review Asthma Action Plan every visit
- Targeted Exposure Reduction to Mold, Dust Mites, Dog
- Albuterol prn
- Cetirizine prn
- Refer for home visit.
- Based upon adherence “Sanitarians” not needed.
Follow-Up: November 25, 2017

- ACT = 25
- No albuterol use for wks
- Plan to follow closely and decrease medication
- “He doesn’t think he has asthma anymore. Patient and mother credit NP with curing his asthma”
A Multifaceted Home-based Environmental Intervention

- 937 inner-city children
- Intervention activities tailored to child’s sensitization profile
- Targeted allergen exposure reduction improves asthma control

2 years with Targeted Exposure Reduction

• Bedroom-only interventions

• 34 fewer days of wheezing; effect similar to ICS therapy

Case Study:
8 Year Old Male – Multiple Asthma Exacerbations
Emergency Department Protocol
• This is the description from the ED Nurse: on 3/5/17:

• Just discharged an asthmatic patient that needs help. This 8yo little boy is having lots of exacerbations; it sounds like mom is frustrated - they have seen 3 doctors without any progress and have been seen here 3 times since February 5, plus visits in November and December. Allergy testing was completed yesterday (Saturday 3/4/17) morning. Has seen pulmonologist as scheduled. Still no improvement.

• Gave mom some of the materials from our asthma folder. Mom's face lit up when I talked about our program and showed her the folder. Again, they are connected to a pulmonologist, follow up appointment is not until late April.

• Follow up: Specific IgE Respiratory panel showed up that the little boy was positive to everything on the panel. He had never been tested prior to the ED testing him! This led to follow up with allergist for immunotherapy. Parents were finally relieved that there is a true cause. They were frustrated because they were doing medications and specialty appointments and everything right! After education on triggers and making bedroom a safe zone and starting shots, he was only seen once in the ED for the rest of the year. (Relayed on January 15\textsuperscript{th}, 2018)
Substantial Number of Patients Lack Information on Self-Management

(Percentage of children age <18 years)

- **32%** Given an action plan
- **54%** Taught to recognize early signs/symptoms of an asthma attack
- **69%** Taught to respond to an asthma attack
- **40%** Taught how to use a peak flow meter
- **68%** Given advice on environmental control

Disparities in Education
Our experience indicates that good asthma care management can prevent up to 99% of children’s asthma hospitalizations, and 95% of emergency visits. This can totally transform the quality of life for those children.

Guillermo Mendoza, MD
Chief, Department of Allergy
Kaiser Permanente
Asthma: Summary

- Disparities come in many forms
- Solutions – Not “One size fits all”
- First “Do the Right Things”
  - Empower patients……..
Achieving Optimal Outcomes for the Asthmatic Patient – Addressing Disparities by Utilizing the Entire Healthcare Team

Gary Falcetano, PA-C, AE-C
Clinical Educator
gary@falcetano.com
609-577-5351