Primary Care Management of Food Allergy and General Public Knowledge and Beliefs

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What are the key misconceptions the general public has in regards to food allergies?

• Survey of 2,148 adult participants in 2008

• Knowledge is poor concerning the distinction between food allergy and food intolerance, the absence of a cure, and current means to treat food allergy.

• In the unadjusted analysis:
  – 49% of participants stated that lactose intolerance was the same as a milk allergy
  – 54% of participants stated there was a cure for food allergy
  – 36% stated that daily medication can prevent a food allergy reaction

Food Allergy Misconceptions in the General Public

- Policies around food allergy:
  - Nearly 85% of respondents agreed that schools should have plans to keep food-allergic children safe.
  - Respondents with school-aged children tended to oppose food allergy specific policy action:
    - 68% of participants were opposed to banning peanut products in schools
    - 47% did not feel that schools should have special tables for food-allergic children
    - 64% of those with school-aged children without food allergy felt it would be unfair if their children were not able to have a peanut butter sandwich at school

How should a primary care physician play a role in managing food allergies?

- The pediatrician is often the first and sometimes only physician children can access.

- Even if children are referred to an allergist, the time from referral to being seen was on average 4 months in the Chicago and suburban areas*.

- Pediatricians must provide the means and guidance to appropriately manage reactions in the interim.

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**Guidelines to Food Allergy Management**

1. Document Reaction History
2. Testing
3. Prescribe Medication
4. Counseling
5. Referral to Allergist

### 1. Document Clinical History

**BE SURE TO DOCUMENT:**
- Reaction History
- Suspected Foods
- Medications Given
- Caregiver Response (ED, PCP, ETC.)

### 2. Test Specific IgE

Test IgE only for suspected foods

### 3. Prescribe Epinephrine

Ensure child has 2 auto-injectors at all times
- Brands: Epi-Pen, Auvi-Q, Adrena-Click (generic)
- Children Dosage: 0.15 mg < 25kg or 0.30 mg > 25kg

### 4. Document Food Allergy Counseling

- Allergen Avoidance
- Reaction Recognition
- Epinephrine Usage (when, how)
- Use of Food Allergy & Anaphylaxis Emergency Care Action Plan

### 5. Referral to an Allergist
1) Document Reaction History

- Begin with detailed medical history, including:
  - Reaction History
  - Suspected Foods
  - Caregiver Response (ED, PCP, etc.)
  - Medications Given
2) Testing

- Pediatricians can use allergen-specific serum immunoglobulin E (IgE) test to the specific food suspected.

- **Do not** use a food allergy panel

- Discuss testing with allergist you refer to
3) Know What Medications to Prescribe

• *Epinephrine auto-injector*
  - *EpiPen*
  - *Auvi-Q*
  - *AdrenaClick (Generic)*
  - *Kids*< 25kg = .15 mg
  - *Kids*>25kg = .30 mg
  - *Must keep 2 with them at all times*

• Recommended dosing is 0.01mg/kg up to 0.5mg IM
  - 1:1000 epinephrine (1mg/ml)

NIAID Guidelines
Anaphylaxis Practice Parameters. JACI.2005
Muraro A. Et Al. Mgmt. Anaph childhood. Allergy 2007
Sampson et al. JACI 2006;117:391-7
4) Counseling

- Allergen Avoidance
- Reaction Recognition
- Usage of Epinephrine auto-injector
- Food Allergy & Anaphylaxis Emergency Care Plan
Physician Support Tool

**FOR PATIENTS:**
Take this Food Allergy History Test to help your provider determine if your child has a food allergy. If your child is here for a follow up visit please complete the questions also.

**Step 1:** Answer every question on this page to the best of your ability. There is no right or wrong answer.

**Step 2:** Take the test to your healthcare provider to talk about whether your child has a new food allergy.

1. Does your child have a current diagnosis of food allergy? Yes or No If No, proceed to #5.
2. Has your child had a food allergy reaction since their last visit? Yes or No If No, complete #3 and #4 then stop.
   - Details of the reaction: ______________________
3. Does your child have an up-to-date prescription for an epinephrine auto-injector? Yes or No
4. Does your child have an up-to-date food allergy & anaphylaxis emergency care plan? Yes or No

5. **What food do you think was responsible for your child’s reaction?**
   - Peanut
   - Shellfish
   - Milk
   - Soy
   - Tree nut
   - Fish
   - Egg
   - Wheat
   - Other food: ______________________

6. **What happened to your child after eating the food?**
   - Trouble breathing
   - Belly pain
   - Fainting
   - Tingling Mouth
   - Throat tightening
   - Nausea
   - Hives
   - Itching (Location: _____)
   - Repetitive cough
   - Vomiting
   - Swelling
   - Rash (Location: _____)
   - Other reaction: ______________________

7. **How long after eating the food did your child have the reaction?**
   - ____ hour(s) and ____ minutes.

8. **How did you respond?**
   - Self-management
   - Phone call to doctor or nurse
   - Primary care provider's office visit
   - Called 911
   - Emergency Department (ED) or urgent care
   - Hospital admission

9. **What medications were given to your child?**
   - Antihistamine (Brand: Benadryl®, Claritin®, Allegra®, Zyrtec® Other brand: _____)
   - Epinephrine auto-injector (Brand: EpiPen®, Auvi-Q®, Adrenaclick®, Generic)
   - Steroid
   - No medications
   - Other medications: ______________________

10. **Other comments about today’s visit:**
Physician Support Tool

FOR HEALTHCARE PROVIDERS ONLY:
Plan for food allergy

Prescribe epinephrine auto-injector
Brand: EpiPen®  Auvi-Q®  Adrenaclick®  Generic
Dose: 0.15 mg (for children <25 kg)  0.3 mg (for children ≥25 kg)

Prescribe antihistamines
Medication: Diphenhydramine  Loratadine  Cetirizine  Fexofenadine
Other: ____________________________________________
Dose: ____________________________________________

Prescribe other medication: ____________________________________________

Order allergen-specific IgE (sIgE) testing for: ____________________________________________

Provide food allergy & anaphylaxis emergency care plan
Provide educational pamphlet
Refer to allergist

Counseling for food allergy

Counsel patient and family on:
Allergen avoidance
How to recognize an allergic reaction
When to use epinephrine auto injector versus antihistamine
How to use the epinephrine auto injector (Provide brand-specific instructions)
Discuss food allergy & anaphylaxis emergency care plan
Discuss school and camp management
Medication identification jewelry
Food allergy prognosis (Provide allergen-specific prognosis)

Other notes:

Healthcare Provider’s Signature_________________________  Date__/__/____
5) Referral to Allergist

• Work with your allergist to develop a plan for the child.
Food Allergy Guideline Adherence Among Pediatricians

- Chart reviews of patients from three clinics—two in suburban Chicago and one from urban Chicago clinic revealed high rates of guideline adherence with respect to allergist referral (67.3%)
- Less consistent adherence regarding:
  - Documentation of reaction history (38.8%)
  - Appropriate use of diagnostic tests (34.7%)
  - Prescription of epinephrine auto-injectors (44.9%)
  - Counseling families in food allergy management (24.5%)

Quality of Care

- Surveys from 849 families with at least one food allergic child were included in analysis.

- Almost all parents felt that they were treated with courtesy and respect by their child’s pediatrician (99%).

- Parents felt that their children’s pediatricians (98%) listened to their questions and concerns.

- Parents felt their pediatrician (94%) showed respect for what they had to say about their child’s food allergies.

- Parents also reported that their child’s pediatrician (84%) explained food allergy in a way they could understand.

Quality of Care

• Parents reported 36% of pediatricians explained when to use epinephrine for their child’s food allergy

• Only 17% of pediatricians demonstrated how to use epinephrine

• 20% of pediatricians provided a written emergency health care plan to help manage their child’s allergic reaction

Potential Reasons for Guideline Nonadherence by Pediatricians

• Pediatricians suggested that poor adherence was due to:
  • Lack of documentation
  • Time constraints prevented complete documentation in the patient’s chart
  • Unfamiliarity with guidelines
  • Clarity regarding the pediatrician’s role in managing food allergy

➤ Findings emphasize the need to better establish the role of the pediatrician and to improve awareness and adherence to guidelines.

How can the absence of physician involvement affect the management of food allergies for families and children?

• Many families without physician involvement:
  – Simply avoid the food allergen
  – Do not carry epinephrine or any medications
  – Have higher rates of ED visits
  – Do not have an action plan in schools
  – Do not always avoid cross contaminated food
  – Have not been counseled on avoidance or risks
Rates of ED visits

- Ambulatory care visits, including emergency department (ED) visits, due to food allergies are on the rise
- Over a 5-year study period (2008-2012), there were a total of 1,893 ED visits due to food-induced anaphylaxis among children in Illinois

Cost of Food Allergy Medical Visits

• Data analyzed from 1,623 US caregivers with a food-allergic child

• Children in the lowest income stratum spend two and one half times the amount on emergency department and hospitalization costs as a result of their food allergy than higher income children ($1,021, SE ±$251 versus $416, SE ±$99).

• Spending on specialists visits were lower in the lowest income group ($228, SE ±$22) compared with the highest income group ($311, SE ±$18).

Many children do not have an action plan in schools

- 400,000+ students in 675 Chicago Public Schools
- 55% of all district-issued epinephrine auto-injectors were administered for first-time anaphylactic events
- Only 50% of the food-allergic students had a school health management plan on file (504 Plan)
- 40.1% of students with food allergy also had asthma

What are ways in which knowledge regarding the diagnosis and management of food allergies can be increased among primary care providers?

- Sampled 407 primary care physicians
- 22% felt adequately prepared by their medical training to care for food-allergic children
- 28% felt comfortable interpreting lab tests to diagnose food allergy
- It is not clear:
  - When to give epinephrine
  - When to test
  - How testing should be interpreted

Available Resources

• Follow 5 steps to diagnosis:
  1. Document Reaction History
  2. Testing
  3. Prescribing Medication
  4. Counseling
  5. Referral to Allergist

• NIAID guidelines

• Medical Home Chapter Champions Program on Asthma, Allergy and Anaphylaxis

• AAP Initiatives:
  – Webinars
  – CME

• foodallergythrive.com
  – Video for primary care physicians
  – Parent educational handout
  – Food allergy management tool
What are your recommendations to further improve the quality of care for patients with food allergies?

• More comprehensive training for pediatricians - mandatory training in residency programs

• Additional updates for practicing pediatricians:
  – Maintenance of certification
  – CME
  – Additional training opportunities at the AAP meetings

• Better establish the role of the pediatrician in the care of food-allergic children

• Provide a consistent message
What are the costs associated with food allergies?

Total Annual Cost per Child: $4,184

Total Annual Cost In the U.S.: $24.8 billion
Economic Impact

• Cross-sectional survey conducted from 2011-2012

• Representative sample of 1,643 US caregivers of a child with a current food allergy

• Caregivers of children with food allergies were asked to quantify:
  – Direct medical cost
  – Out-of-pocket cost
  – Lost labor productivity
  – Related opportunity cost
  – Willingness to pay for an effective food allergy treatment

<table>
<thead>
<tr>
<th>Variable</th>
<th>% Reporting Cost (SE)</th>
<th>Mean Direct Out-of-Pocket Costs, US$ (SE)</th>
<th>Cost Per Child, US$</th>
<th>Overall Annual Cost (in Millions), US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visits to the physician’s office of health clinic (including copays)</td>
<td>52.5 (2.2)</td>
<td>160 (14)</td>
<td>84</td>
<td>499</td>
</tr>
<tr>
<td>Visits to the emergency room (including copays)</td>
<td>16.1 (1.6)</td>
<td>247 (42)</td>
<td>40</td>
<td>235</td>
</tr>
<tr>
<td>Overnight Stays at the hospital</td>
<td>10 (1.4)</td>
<td>411 (182)</td>
<td>41</td>
<td>244</td>
</tr>
<tr>
<td>Travel to and from health care visits (including ambulance use; parking expenses)</td>
<td>27.7 (1.8)</td>
<td>91 (14)</td>
<td>25</td>
<td>149</td>
</tr>
<tr>
<td>Epinephrine injectors</td>
<td>35.9 (1.9)</td>
<td>87 (4)</td>
<td>31</td>
<td>184</td>
</tr>
<tr>
<td>Antihistamines</td>
<td>50.8 (2.2)</td>
<td>62 (4)</td>
<td>32</td>
<td>188</td>
</tr>
<tr>
<td>Other prescription/nonprescription medications</td>
<td>29.3 (1.9)</td>
<td>122 (13)</td>
<td>36</td>
<td>211</td>
</tr>
</tbody>
</table>

### Out-of-Pocket Costs (cont’d)

<table>
<thead>
<tr>
<th>Variable</th>
<th>% Reporting Cost (SE)</th>
<th>Mean Direct Out-of-Pocket Costs, US$ (SE)</th>
<th>Cost Per Child, US$</th>
<th>Overall Annual Cost (in Millions), US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-traditional medicine</td>
<td>15 (1.6)</td>
<td>123 (30)</td>
<td>19</td>
<td>110</td>
</tr>
<tr>
<td>Costs associated with special diets and allergen-free food</td>
<td>37.7 (2.0)</td>
<td>756 (59)</td>
<td>285</td>
<td><strong>1689</strong></td>
</tr>
<tr>
<td>Additional/change in child care</td>
<td>6.7 (0.8)</td>
<td>2158 (323)</td>
<td>145</td>
<td>857</td>
</tr>
<tr>
<td>Legal guidance</td>
<td>2.3 (0.6)</td>
<td>402 (122)</td>
<td>9</td>
<td>55</td>
</tr>
<tr>
<td>Counseling or mental health services</td>
<td>4.5 (0.7)</td>
<td>571 (123)</td>
<td>26</td>
<td>152</td>
</tr>
<tr>
<td>Special summer camp</td>
<td>3 (0.7)</td>
<td>702 (183)</td>
<td>21</td>
<td>125</td>
</tr>
<tr>
<td>A change in schools was needed due to food allergy</td>
<td>4.2 (0.7)</td>
<td>2611 (497)</td>
<td>110</td>
<td>650</td>
</tr>
<tr>
<td>Other expenses (e.g., cleaning supplies)</td>
<td>9.5 (1.1)</td>
<td>396 (86)</td>
<td>36</td>
<td>216</td>
</tr>
<tr>
<td><strong>Any out-of-pocket costs</strong></td>
<td><strong>74.3 (2.1)</strong></td>
<td><strong>1252 (90)</strong></td>
<td><strong>931</strong></td>
<td><strong>5516</strong></td>
</tr>
</tbody>
</table>

Out-of-pocket costs: medical costs borne by patient associated with the prevention, diagnosis, and treatment of food allergies. Includes all costs associated with protecting the child from exposure to allergens, including special child care arrangements. The out-of-pocket costs exclude the top 1% of reported costs in each category.

## Opportunity Costs*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Reporting, % (SE)</th>
<th>Opportunity, Mean (SE)</th>
<th>US$</th>
<th>Overall Annual (in Billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choice of Career has been restricted</td>
<td>5.7 (0.9)</td>
<td>15 655 (2471)</td>
<td>892</td>
<td>5.3</td>
</tr>
<tr>
<td>A job had to be given up</td>
<td>4.9 (0.7)</td>
<td>29 657 (4151)</td>
<td>1453</td>
<td>8.6</td>
</tr>
<tr>
<td>A job was lost through dismissal</td>
<td>1.9 (0.6)</td>
<td>14 849 (7479)</td>
<td>282</td>
<td>1.7</td>
</tr>
<tr>
<td>A job change was required</td>
<td>2.5 (0.6)</td>
<td>10 605 (3161)</td>
<td>265</td>
<td>1.6</td>
</tr>
<tr>
<td>Any job-related opportunity cost (total amount)**</td>
<td>9.1 (1.0)</td>
<td>32 719 (4166)</td>
<td>2977</td>
<td>17.6</td>
</tr>
<tr>
<td>Any job-related opportunity cost (maximum amount)***</td>
<td>9.1 (1.0)</td>
<td>26 363 (2545)</td>
<td>2399</td>
<td>14.2</td>
</tr>
</tbody>
</table>

*Opportunity cost is the additional cost associated with activities forgone as a result of a child’s food allergy

**All possible responses were used to calculate job-related opportunity cost

***Only the maximum of 4 possible responses was used to calculate job-related opportunity cost

## Comparing WTP & Measure of Actual Cost

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total (in Billions)</th>
<th>Per Child</th>
<th>Total (in Billions)</th>
<th>Per Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>WTP</td>
<td>20.8</td>
<td>3504</td>
<td>(15.7-25.7)</td>
<td>(2652-4344)</td>
</tr>
<tr>
<td>Costs borne by families</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Out-of-pocket treatment</td>
<td>5.5</td>
<td>931</td>
<td>(4.7-6.4)</td>
<td>(793-1080)</td>
</tr>
<tr>
<td>Lost labor productivity</td>
<td>0.77</td>
<td>130</td>
<td>(0.53-1.0)</td>
<td>(89-175)</td>
</tr>
<tr>
<td>Opportunity</td>
<td>14.2</td>
<td>2399</td>
<td>(10.5-18.4)</td>
<td>(1771-3104)</td>
</tr>
<tr>
<td>Total</td>
<td>20.5</td>
<td>3457</td>
<td>(16.7-24.9)</td>
<td>(2816-4208)</td>
</tr>
<tr>
<td>Reported costs borne by families</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct medical costs</td>
<td>4.3</td>
<td>724</td>
<td>(2.8-6.3)</td>
<td>(472-1063)</td>
</tr>
<tr>
<td>Reported costs</td>
<td>24.8</td>
<td>4184</td>
<td>(20.6-29.4)</td>
<td>(3475-4960)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Today</th>
<th>Someday</th>
</tr>
</thead>
<tbody>
<tr>
<td>When I was YOUR AGE, there were <strong>no</strong> food allergies.</td>
<td>When I was YOUR AGE, there were <strong>food allergies</strong>.</td>
</tr>
</tbody>
</table>
Questions?