Environmental Management of Pediatric Asthma: Guidelines for Health Care Providers

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NEEF
Pediatric Asthma

• Most prevalent chronic medical condition in childhood

• 7.1 million (9.6%) US children in 2009¹
  – Low income children more likely to have increased morbidity from asthma²
  – Low income children less likely to receive preventive care²

Variation in Asthma Severity by Race/Ethnicity

- African-American and Latino children worse asthma status than comparable white children\(^1\)
- African-American children as compared to white children\(^2\)
  - >2 times as likely to be hospitalized
  - >3 times as likely to die from asthma


Variation in Asthma Care by Race/Ethnicity

• African-American children less likely to have made office visit for asthma (OR 0.77)¹

• African-American and Latino children less likely to use inhaled corticosteroids (OR 0.78 and 0.66 respectively)²

National Survey on Environmental Management of Asthma

Assessed public’s knowledge of environmental asthma triggers and their actions to manage environmental triggers.

- People from low income, low education households are more likely to have asthma.
- Less than 30% of people with asthma are taking all the essential actions recommended to reduce their exposure to indoor environmental asthma triggers.
- People with written asthma action plans are more likely to take actions to reduce exposure to environmental asthma triggers; however, only 30% of people with asthma have a written asthma action plan.
- Children with asthma are just as likely to be exposed to ETS in their home as children in general.

US Environmental Protection Agency 2004
National Asthma Education and Prevention Program
Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma

www.nlm.nih.gov/guidelines/asthma/asthgdln.htm
GIP Report: Six Priority Messages

- Use inhaled corticosteroids
- Use a written asthma action plan
- Assess asthma severity
- Assess and monitor asthma control
- Schedule periodic asthma visits
- Control environmental exposures
Message #1: Use Inhaled Corticosteroids

- Inhaled corticosteroids are the most effective medications for persistent asthma
- Well tolerated
  - Small decrease in linear growth, but diminishes over time
- Superior to montelukast alone as preventive agent\(^1,^2\)

\(^1\)Rachelefsky G. Pediatrics 2009;123:353-66
Message #2: Use Written Asthma Action Plan

- All medications written in one place
- Based on peak flow monitoring
- Find out predicted based on height
- **Green Zone**: 80% of predicted or more
- **Yellow Zone**: 50-80% of predicted
- **Red Zone**: 50% of predicted or less
Asthma Action Plan

Message #3: Assess Asthma Severity

• Classify all patients’ asthma based on measures of current impairment and future risk

• **Impairment:** Think Rule of 2s
  – Intermittent -- < 2 days/week of symptoms and less than 2 days/week of bronchodilators
  – Persistent– if at least $\geq 2$ days/ week of symptoms and bronchodilator use
  – Persistent asthma also includes activity limitations

• **Risk:** # exacerbations requiring oral steroids
  – 0-1/year = Intermittent asthma
  – $\geq 2$/year = Persistent asthma
Message #4: Assess and Monitor Asthma Control

• Well Controlled (regardless of classification)
  – ≤ 2 days/week of symptoms
  – ≤ 1 nighttime awakening/month
  – ≤ 2 days/week of bronchodilator

• Not well controlled
  – > 2 days/week symptoms
  – ≥ 2 nighttime awakenings/month
  – > 2 days/week of albuterol

• Very Poorly Controlled
  – Daily symptoms and multiple doses of albuterol/day

*No limit in activity indicates good control
Message #5: Schedule Follow-up Visits

• Schedule planned follow-up visits at periodic intervals to assess asthma control and modify treatment if needed
  – 1-6 months depending on control
  – 3 month interval if step down in therapy is anticipated

• Consider a patient reminder system for these visits
Message #6: Control Environmental Exposures

• Review the environmental history of exposures
• Develop a multi-pronged strategy to reduce exposure to those triggers to which a patient is sensitive
• Remainder of presentation focuses on evidence of exposure mediation and recommendations for your patient
### Indoor Exposures and Exacerbation of Asthma

- **Sufficient evidence of Causal Relationship**
  - Cat
  - Cockroach
  - ETS (preschooler)
  - House dust mite

- **Sufficient evidence of an Association**
  - Dog
  - Molds
  - Rhinovirus
  - NO$_2$ & NO$_x$

- **Limited evidence of Association**
  - Formaldehyde Fragrances
  - RSV
  - ETS (school-aged and older children)

*Clearing the Air. Committee on the Assessment of Asthma and Indoor Air; Division of Health. Promotion and Disease Prevention; Institute of Medicine, 2000.*
What is the Evidence of Environmental Trigger Control?
Dust Mite Control

- Randomized Controlled Trial (RCT)
  - Group 1-- polyurethane casings for bedding, tannic acid on the carpets
  - Group 2-- Benzyl benzoate on mattresses and carpets at time 0, and 4 & 8 months
  - Group 3-- Placebo foam on the mattresses and carpets at time 0, and 4 & 8 months
- Decreased mite allergen on Group 1 mattresses
- Children of Group 1 with reduced airway reactivity

Dust Mite Control

• Improvements from dust mite encasements\(^1\)
  – Reduced dust mite allergen
  – Improved bronchial hyper-responsiveness

• Improved allergen level, but…
  – No improvement in symptoms, medication needs or bronchial hyper-responsiveness\(^2\)

• Mattress encasement + immunotherapy
  – Encasements alone reduced dust mite concentration
  – Immunotherapy with additional symptomatic improvement

\(^1\)Van der Heide S Allergy 1997:52:9121-7
Dust Mite Control

- Danish study in children (n = 60)
  - Allergen impermeable mattress covers
- Significant reduction in dust mite allergen for intervention group
- Significant decrease in effective dose of inhaled steroid by 9 months and by 12 months was half the dose of control group
- No effect on bronchial hyper-responsiveness
- Is comprehensive trigger control a better idea?

Cats Stick with You

- Classrooms with many (>25% of class) cat owners had more cat allergen than other classrooms
- Allergen levels in non-cat owners’ clothes increased after one day in that classroom
- Exposure through school can exacerbate asthma in sensitized children even if they don’t own a cat

Almqvist C. *J Allergy Clin Immunol* 1999;103:1002-4
Almqvist C et al. *Am J Respir Crit Care Med* 2001;163:694-8
Control of Cat Ag

• RCT with 35 cat-allergic (and owner) subjects
  – High-efficiency particulate arresting (HEPA) air cleaner
  – Mattress and pillow covers
  – Cat exclusion from bedroom
• Reduced airborne cat allergen levels
• No effect on disease activity
• In cat allergic individuals with asthma, intranasal steroids were effective

Wood RA Am J Respir Crit Care Med 1998;158:115-20
Control of Cat/Dog Ag

- RCT – 36 subjects sensitized and exposed to cat and/or dog allergen; 30 completed study
- Intervention was HEPA air cleaner only
  - Control used a sham air cleaner filter
- Higher concentrations of cat/dog Ag were filtered in the HEPA cleaner than sham filter
  - No change in bulk dust Ag from home samples
- Decrease in nocturnal symptoms
- Trend towards improvement in bronchial hyper-responsiveness, but not significant

Mouse Ag

- Inner city population in Boston
  - 42% had mouse allergen in home\(^1\)
  - Associated with black race, reported visible evidence of mice exposure, cockroach allergen
- Potentially greater mouse exposure in school
  - Matched classroom and home samples in 23 asthmatic children\(^2\)
  - 46 rooms in 4 urban, Northeastern schools
  - Mouse Ag levels significantly higher in school samples v. bedroom samples (6.45 mcg/g v. 0.44 mcg/g)

\(^1\)Phipatanakul W, et al. Allergy 2005;60:697-701
Mouse Ag

• 18 homes of children with persistent asthma and positive mouse allergen

• Integrated pest management
  – Filled holes
  – Vacuum and cleaning
  – Low-toxicity pesticides and traps

• Mouse allergen levels significantly reduced during 5 month period

Cockroach Ag Control

• Home extermination— 2 applications
  – Abamectin, Avert
• Directed education on cockroach allergen removal
• 50% of families followed cleaning instructions, no greater effect was found in these homes
• At 12 months, allergen had returned to or exceeded baseline levels

Cockroach Ag Control

- Occupant education, professional cleaning
- Insecticide bait
- Substantial reductions in cockroach allergy levels achieved\(^1\)
- Second Study– Professional cleaning
  - Bait traps with insecticide
  - Bait traps without insecticide
  - Significant reduction in cockroach allergen\(^2\)

\(^1\)Arbes SJ et al. *J Allergy Clin Immunol* 2003;112:339-45
Integrated Pest Management

• Pest control strategy that involves “least toxic methods first”
• Strategies vary, but often may include:
  – Mousetraps
  – Sealing cracks/ small holes
  – Resident education
  – Plastic food storage containers
  – Generalized cleaning
• Strategic placement of pest control treatments, often in the form of bait traps or gels
Integrated Pest Management
Boston Public Housing

• 39 apartments among 3 public housing buildings
• IPM as described in prior slide
• Dust collection sampling for cockroach antigen
  – Bedding (including mattress and pillows)
  – Kitchen cupboards under sink and kitchen floor
• Reduction in cockroach antigens (Bla g 1, Bla g 2)
  – Kitchen-- 71% and 86% by 6 months
  – Bed– 53% and 70% by 6 months
• Decline was not sustained beyond 6 months
• No clinical correlation

Integrated Pest Management
New York City Public Housing (NYCPH)

- Randomized 13 buildings to either IPM or Control groups
  - Trained public housing resident to become IPM technician for their building
  - IPM as described above
  - No scheduled visits, but solid or gel baits applied if needed
- Control group received standard NYCPH pest control on a scheduled basis
  - Baseboard spraying with pyrethroid insecticide
- IPM group had significantly lower cockroach counts
  - Noticed by 3 months, sustained through 6 months
- IPM group with lower cockroach allergen levels
  - Kitchen by 3 months,
  - Beds by 6 months

Mold Control
RCT – 62 patients

- Pre-remediation period-- ~120 days
  - Before randomization, all received information on improving indoor air quality, home fungal sampling, and spirometry
  - Both groups had decrease in number of asthma symptomatic days

- Post remediation (Remediation Group)
  - Remediation group had significant decrease in mold levels, persisting through 12 months (p = 0.009)
  - Decrease in symptom days for remediation (p = 0.003)
    - No further change in symptom days in control group
  - Remediation group with lower rate of exacerbations compared to control group
    - 1 of 29 v. 11 of 33; p = 0.003

Kercmar CM, et al. Env Health Persp 2006;114:1574-80
The Community Guide: Asthma Control
Centers for Disease Control & Prevention

• Systematic review of available studies
• Findings: Strong evidence of effectiveness in reducing symptom days, improving quality of life or symptom scores, and in reducing the number of school days missed
• Recommendations: Use of home-based, multi-trigger, multicomponent interventions with an environmental focus for children and adolescents with asthma

CDC Task Force Findings and Rationale Statement Interventions for Children and Adolescents with Asthma [link](http://www.thecommunityguide.org/asthma/rrchildren.html)
Last updated: 6/15/2010
Combined Asthma Trigger Management

• Patients can be sensitive and exposed to numerous triggers
• RCT-- 100 subjects
• Treatment group received
  – Home-based education
  – Roach and Rodent extermination
  – Mattress and pillow encasings
  – HEPA cleaner
• Control group did get treatment at end of 12 month period

Combined Asthma Trigger Management

- 84% received cockroach extermination
- 75% used the HEPA cleaner
- 39% decline in PM10 levels in treatment group
  - Increase in the control group (p < 0.001)
- 52% decrease in cockroach allergens in treatment group
- Decrease in daytime symptoms in treatment group
  - Increased in control group (p = 0.04)

Inner City Asthma Study

• Evaluates multiple trigger management
• 937 urban children with asthma
  – 1 year of intervention, 1 additional year of follow up
• Evaluation --questionnaire and skin testing
• Home sampling --dust, cockroach, cat and dog allergen
• Interventions aimed at patient-specific triggers
  – Allergen impermeable mattress and pillow covers
  – HEPA air filters and vacuum cleaners
  – Professional pest control

Inner City Asthma Study
Results and Cost Effectiveness

• Fewer days with symptoms\(^1\)
• Greater decline in level of allergens at home\(^2\)
  – Persisted through 2\(^{\text{nd}}\) “follow up” year
  – Dust and cockroach Ag correlated with fewer complications of asthma
• Cost Effectiveness analysis\(^3\)
  – 38 more symptom free days
  – Under $30 per symptom free day

\(^3\)
Evidence for Outdoor Air Triggers Reducing Traffic: 1996 Atlanta Olympics

- The Intervention:
  - Around-the-clock public transportation
  - 1,000 buses added
  - Downtown city streets closed to private cars
  - Downtown delivery schedules altered
  - Flexible and telecommuting work schedules encouraged

Reducing Traffic Reduces Asthma
1996 Atlanta Olympics

- Weekday morning traffic counts dropped 22.5%
- Peak daily ozone concentrations decreased 27.9%

Mean Levels of Major Pollutants Before, During, and After the 1996 Summer Olympic Games as a Percentage of the National Ambient Air Quality Standard (NAAQS)

### Acute Asthma Events During 1996 Olympics - Atlanta

<table>
<thead>
<tr>
<th>Type of claim</th>
<th>% change in mean # of Asthma claims per day</th>
<th>% change in mean # of Non-Asthma claims per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicaid Hosp and ED Visits</td>
<td>-41.6%</td>
<td>-3.1%</td>
</tr>
<tr>
<td>HMO ED, Urgent Visit, Hosp</td>
<td>-44.1%</td>
<td>+1.3%</td>
</tr>
</tbody>
</table>

Southern California Children’s Health Study
Traffic-related air pollution and childhood asthma

• Cohort study (n=2,497) examined the effects of traffic-related pollutants near children’s schools and homes
  – Asthma and wheeze were strongly associated with residential proximity to a major road¹
    – Greatest risk among children living within 300 m of major roads or freeways and risk increased significantly within 75 m¹
    – Incident asthma was positively associated with traffic pollution among children at school and home, with a hazard ratio of 1.61²,³

Environmental Management of Pediatric Asthma: Guidelines for Health Care Providers

• Founded upon NHLBI Guidelines
• Intended to complement its clinical and pharmacological components
• Developed for primary care providers
  – Pediatricians, family physicians, internists
  – Nurse practitioners, physician assistants
• Authored by expert steering committee and peer reviewed
• Built on scientific literature and best current practices

www.neefusa.org/health/asthma
Overview of Asthma Guidelines

• Developed for children 0-18 years, already diagnosed with asthma

• Applies to all settings where children spend time
  – Homes, schools, and daycare centers
  – Cars, school buses
  – Camps, relatives’/friends’ homes, other recreational or housing settings
  – Occupational environments
Components of Asthma Guidelines

- Educational competencies
- Environmental history form
- Environmental intervention guidelines
- Sample Patient Flyers and References
- Supplemented by online list of resources with web-links
  - www.neefusa.org/health/asthma/asthma_resources

- Available in English and Spanish online, in hard copy, and on CD-ROM
  - www.neefusa.org/health/asthma/asthmaguidelines
Environmental History Form

• Quick intake form
• Administered by health care provider
• Available online as PDF and Word document
• Can be pasted or re-copied into electronic medical record template
• Questions are in yes/no format
  – Follow up yes answer with in-depth questions on Intervention Guidelines fact sheets
Environmental History Form

• Parent or child will likely answer questions about exposure with own home in mind
  – Remember to consider other places the child spends time: school, daycare, car, work

• Designed to capture major trigger areas
  – Once identified as a problem, (i.e. dust mites) the intervention sheet provides additional questions

www.neefusa.org/health/asthma/asthmahistoryform
Environmental History Form for Pediatric Asthma Patient

Specify that questions related to the child’s home also apply to other indoor environments where the child spends time, including school, daycare, car, school bus, work, and recreational facilities.

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is your child's asthma worse at night?</td>
<td></td>
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<tr>
<td>Is your child's asthma worse at specific locations?</td>
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<tr>
<td>If so, where?</td>
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<tr>
<td>Is your child's asthma worse during a particular season?</td>
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<tr>
<td>If so, which one?</td>
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<tr>
<td>Is your child's asthma worsened with a particular change in climate?</td>
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<tr>
<td>If so, which?</td>
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<tr>
<td>Can you identify any specific trigger(s) that makes your child’s asthma worse?</td>
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<tr>
<td>If so, what?</td>
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<tr>
<td>Have you noticed whether dust exposure makes your child’s asthma worse?</td>
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<tr>
<td>Does your child sleep with stuffed animals?</td>
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<tr>
<td>Is there wall-to-wall carpet in your child’s bedroom?</td>
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<tr>
<td>Have you used any means for dust mite control?</td>
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<tr>
<td>If so, which ones?</td>
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<tr>
<td>Do you have any furry pets?</td>
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<tr>
<td>Do you see evidence of rats or mice in your home weekly?</td>
<td></td>
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<tr>
<td>Do you see cockroaches in your home daily?</td>
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<tr>
<td>Do any family members, caregivers or friends smoke?</td>
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<tr>
<td>Does this person(s) have an interest or desire to quit?</td>
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<tr>
<td>Does your child/teenager smoke?</td>
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<tr>
<td>Do you see or smell mold/mildew in your home?</td>
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<tr>
<td>Is there evidence of water damage in your home?</td>
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<tr>
<td>Do you use a humidifier or swamp cooler?</td>
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<tr>
<td>Have you had new carpets, paint, floor refinishing, or other changes at your house in the past year?</td>
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<tr>
<td>Does your child or another family member have a hobby that uses materials that are toxic or give off fumes?</td>
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<tr>
<td>Has outdoor air pollution ever made your child’s asthma worse?</td>
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<tr>
<td>Does your child limit outdoor activities during a Code Orange or Code Red air quality alert for ozone or particle pollution?</td>
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<tr>
<td>Do you use a wood burning fireplace or stove?</td>
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<tr>
<td>Do you use unvented appliances such as a gas stove for heating your home?</td>
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<tr>
<td>Does your child have contact with other irritants (e.g., perfume, cleaning agents, or sprays)?</td>
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</tr>
</tbody>
</table>

What other concerns do you have regarding your child’s asthma that have not yet been discussed?
### Cuestionario de Historia Ambiental para el Paciente con Asma Pediátrica

Especifique que preguntas relacionadas al hogar del niño también se aplican a otros ambientes internos donde el niño pasa el tiempo, incluyendo escuela, guardería, colegio, baserriales, trabajo e instalaciones recreativas.

<table>
<thead>
<tr>
<th>Seguimiento/Notas</th>
</tr>
</thead>
<tbody>
<tr>
<td>¿Empiezan el asma a su hijo(a) en la noche?</td>
</tr>
<tr>
<td>¿Empieza el asma a su hijo(a) en un lugar específico?</td>
</tr>
<tr>
<td>Si es así, ¿dónde?</td>
</tr>
<tr>
<td>¿Empieza el asma a su hijo(a) durante una estación en particular?</td>
</tr>
<tr>
<td>Si es así, ¿cuál es?</td>
</tr>
<tr>
<td>¿Empieza el asma a su hijo(a) durante un cambio particular de tiempo?</td>
</tr>
<tr>
<td>Si es así, ¿cómo cambia?</td>
</tr>
<tr>
<td>¿Pueden identificar algún(s) de sentimiento(s) específico(s) de asma en su hijo(a)?</td>
</tr>
<tr>
<td>Si es así, ¿cómo lo siente?</td>
</tr>
<tr>
<td>¿Ha resultado el tránsito aéreo para empezar el asma en su hijo(a)?</td>
</tr>
<tr>
<td>¿Existe alérgenos con materiales de polvo?</td>
</tr>
<tr>
<td>¿Tiene el descanso de su hijo(a) al aire libre de papeles?</td>
</tr>
<tr>
<td>¿Ha tomado algún alérgeno del control de alérgenos de polvo?</td>
</tr>
<tr>
<td>Si es así, ¿cuáles?</td>
</tr>
<tr>
<td>¿Tiene algunos alérgenos en el área?</td>
</tr>
<tr>
<td>¿Ha visto alérgenos en otros lugares en su hogar, senaladamente?</td>
</tr>
<tr>
<td>¿Necesitamos los alérgenos en el hogar?</td>
</tr>
<tr>
<td>¿Fuma algún miembro de la familia, amigo o persona que conoce su hijo(a)?</td>
</tr>
<tr>
<td>¿Está(a) en(a) persona(s) que pueste(a) a fumar?</td>
</tr>
<tr>
<td>¿Fuma su hijo(a) y adolescente?</td>
</tr>
<tr>
<td>¿Hay alérgenos o &quot;quietos&quot; en el área?</td>
</tr>
<tr>
<td>¿Hay alguna evidencia de que el área es sucia en su casa?</td>
</tr>
<tr>
<td>¿Utiliza usted un humidificador?</td>
</tr>
<tr>
<td>¿Ha utilizado alérgenos en el área, pintura, lazo de pisos, u otro cambio en el área durante el último año?</td>
</tr>
<tr>
<td>¿Tiene su hijo(a), a algún otro miembro de la familia, un patrón de tiempo que utiliza materiales que son alérgenos en áreas tóxicas?</td>
</tr>
<tr>
<td>¿Se ha hecho o consumida del alérgeno de su hijo(a) en un área de asma de su hijo(a)?</td>
</tr>
<tr>
<td>¿Odor a las actividades de su hijo(a) con alérgenos en una zona de Calidad de Aire, a la altura cuando hay alérgenos alérgenos contaminantes?</td>
</tr>
<tr>
<td>¿Utiliza usted una escoba o chismes en su casa?</td>
</tr>
<tr>
<td>¿Utiliza usted aparatos como chimeneas o estufas a gas?</td>
</tr>
<tr>
<td>¿Está su hijo(a) en contacto con animales (gato, perro, otros de la casa)?</td>
</tr>
<tr>
<td>¿Desea otras cosas acerca del asma de su hijo(a) que no fueron mencionadas?</td>
</tr>
</tbody>
</table>

Referencia: Manejo Ambiental del Asma Pediátrica, Guía para el Personal de Salud www.niefra.org/health/asthma/astmabasics

Health & Environment National Environmental Education Foundation 4301 Connecticut Avenue, Suite 660 • Washington, DC 20008 • Tel (202) 786-4975 • health@niefra.org • www.niefra.org
Intervention Guidelines

- Two-visit concept
- Short introduction
- Additional in-depth questions
  - Explore exposure sources
  - Parents’ current practices
- Intervention recommendations
- Sample patient handouts to download
- Additional resources on initiative’s website

www.neefusa.org/health/asthma/intervention_guidelines
Allergy Referral?

• In vitro testing for allergens can be considered, but false positives occur
  – Should focus on allergens identified in history
  – Should not replace timely allergy referral

• Low cost environmental interventions are reasonable, especially where wide spread exposure occurs (i.e. dust mites in SE)
  – Costly interventions should be done after you have referred for skin testing
Get Rid of the Dust Mites
Dust Mites
Simple, but Effective Interventions

- Encase all pillows and mattresses of the beds the child sleeps on with allergen impermeable encasings
- Wash bedding weekly to remove allergen
- Wash in HOT water (130°F) to kill mites
- Results generally seen in 1 month
- Avoid ozone generators and some ionic air cleaners that produce ozone
Dust Mites
Other Interventions

• For non-encased bedding (e.g. blankets and quilts) choose items that can withstand frequent hot water washing
• Remove or wash and dry stuffed toys weekly

• Vacuum with a HEPA vacuum cleaner
• Avoid humidifiers
Dust Mites
Possible Interventions

• Replace draperies with blinds
• Remove carpet from child’s bedroom
• Remove upholstered furniture

• These are higher cost and it is recommended that the child have skin test proven allergy to dust mites prior to implementation
Animal Allergens
Additional Questions

• What type of pet and how many of each?
• Indoor v. Outdoor pet?
• Child sleep with pet?

• Was asthma improved when pet outside?
• Furry pet in child’s classroom?
Animal Allergens
Effective Interventions

• Find a new home for indoor pets
• Keep pet outside
• If these aren’t possible…
  – Similar interventions as with dust mites
  – Encasings, HEPA air cleaner, HEPA Vacuum,
  – Keep pet out of bedroom
• Takes 24-30 weeks before allergen levels reach those of non-cat households¹

¹Wood RA et al. J Allergy Clin Immunol 1989;83:730-4
Animal Allergens
Unlikely Interventions

- Bathing cats MAY be effective at reducing allergen ($n = 8$ cats)
  - The reduction was not maintained by 1 week$^1$
  - Therefore it had been recommended to bathe the cat twice a week…
- However, a more recent study of 12 cats suggests the decrease in dander after bathing lasts about 1 day$^2$

$^1$Avner DB et al. J Allergy Clin Immunol 1997;100:307-12
Cockroach Allergen
Do’s and Don’ts of Roach Control

• Integrated pest management (IPM)
  – Least toxic methods first
• Clean up food/spills
• Food and trash storage in closed containers
• Fix water leaks

• Clean counter tops daily
• Boric acid
• Bait stations/ gels
• Don’t!!
  – Spray liquids in house, especially play and sleep space
  – Use industrial strength pesticide sprays that require dilution
Mold and Mildew Interventions

• Ways to control moisture and/or decrease humidity to < 50%
  – Dehumidifier or central air conditioner
  – Do not use a humidifier
  – Vent bathrooms/clothes dryers to outside
  – Use exhaust fan in bathroom/ other damp areas
  – Check faucets and pipes for leaks and repair

• Complete mold abatement may be required using a licensed contractor
Mold and Mildew

Cleaning up the Mess

- Discard items too moldy to clean
- Professional cleaning recommended for areas larger than 3 x 3 ft.
- Clean small areas with detergent and water
- Dilute (1:10 with water) chlorine bleach solution provides cosmetic improvement and kills mold but does not remove allergens and the user should be aware of risks
  - Don’t mix bleach and ammonia!
  - Be aware of respiratory irritant effect of bleach (asthmatics)
- Identify and stop sources of water intrusion
Environmental Tobacco Smoke
Possible Interventions

• Keep home and car smoke free
• Encourage support to quit smoking
  – Recommend aids such as nicotine gum/patch
  – Medication from physician to assist in quitting
• Choose smoke free social settings
• At the very least, do not smoke around your child or in the car!
  – (This should not keep us from encouraging parents to quit)
Air Pollution
Possible Indoor Air Interventions

• Eliminate tobacco smoke
• Install exhaust fan close to source of contaminants
• Ventilate room if fuel burning appliance used
• Avoid use of products emitting irritants
• See control of dust mites and animal allergens
Air Pollution
Possible Outdoor Air Interventions

• Monitor air quality index levels
  – Ozone, Particulate Matter, NOx, SO2
  – Reduce child’s outdoor activities if unhealthy
    • Orange AQI of 101-150 (unhealthy for sensitive groups)
    • Red AQI of 151-199 (unhealthy for all)

• Contact health care provider if more albuterol is needed the day after AQI level is high

www.epa.gov/airnow
Who takes the Advice? 
Seen by Allergists v. Pediatricians

• Patients seen by an allergist had greater knowledge of environmental allergens
  – Dust mite knowledge (71% v. 18%)
  – Need for mattress encasements (61% v. 13%)
  – Need for pillow encasements (51% v. 11%)
• Increased knowledge, but not statistically significant
  – More knowledge about carpet removal (23% v. 11%)
  – Stuffed animal removal (10% v. 2%)
• Made some changes in their home
  – Use of mattresses encasements (38% v. 11%)-- 0.001
  – Use of pillow encasements (36% v. 16%)– 0.009
  – Carpet removal (26% v. 36%)-- NS

Summary

- Written asthma action plans
- Use inhaled steroids as per NHLBI guidelines for persistent asthma
- Reassess impairment and risk, preferably during periodic asthma check-ups
- Environmental management can and should supplement good medical care
- Ask about environmental exposures and seek ways to intervene
- Low cost interventions are effective in children
- Consider allergy referral to define exposure risk
BURDEN OF ASTHMA

• What are some of the burden of asthma?
• What factors augment the burden of asthma?
• What measures can reduce the burden of asthma?
• What particular harmful air pollutants are commonly found around the U.S. – Mexican border?
Environmental Management of Pediatric Asthma

• Case Discussion
Environmental Management of Pediatric Asthma Guidelines for Health Care Providers

Created by support from the National Environmental Education Foundation through the Pediatric Asthma Initiative

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