FACTORS CONTRIBUTING TO ASTHMA EXACERBATIONS

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The NAEEP Expert Panel Report 3 uses the following criteria to specify the level of evidence to justify recommendations made:

- **Evidence A** – Rich body of data – A lot of randomized controlled trials (RCT)
- **Evidence B** – Limited body of data – some RCTs
- **Evidence C** – Non-randomized trials and observational studies
- **Evidence D** – Panel consensus judgment (for when guidance seems valuable but lacks literature backing)
It is essential to identify and reduce exposures to allergens and irritants and to control other factors that have been shown to increase asthma symptoms in your patient.\(^A\)

Effective allergen avoidance requires a multifaceted, comprehensive approach; individual steps alone are generally ineffective.\(^A\)

Focus on allergen-control education for cockroach, dust mite and rodent allergens for patients sensitive to these allergens as these have proven interventions.\(^A\)
This session will cover:

- Allergens
- Irritants
- School, work and outdoor environments
- Other contributing factors
- Exercise-induced bronchospasm
- Co-morbid conditions
<table>
<thead>
<tr>
<th>Allergens</th>
<th>Irritants</th>
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<tbody>
<tr>
<td>• IgE mediated disease</td>
<td>• Not mediated through IgE</td>
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<tr>
<td>• Require sensitization</td>
<td>• Dose-dependent response</td>
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<td>• Affects only those that are sensitized to the allergen</td>
<td>• Will affect everyone at high enough dose</td>
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<tr>
<td>• Not usually dose-dependent</td>
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(See Asthma 101 – Asthma Triggers Handout for examples.)
Assess Environment

• Identify and control triggers to:
  – Prevent symptoms
  – Prevent hospitalizations and ED visits
  – Improve quality of life and self-management skills
  – Reduce medications

**IMPORTANT**: Ask, “Have you noticed anything in your home, work or school that makes your asthma worse?”
Assess Home Triggers

Does the patient:
• Keep a pet?
• Have moisture or dampness in their home environment?
• Have visible mold in any part of their home?
• Smoke or live with a smoker?
• Have a wood burning stove or fireplace?
• Have unvented stoves or heaters?

Common Home Triggers: Allergens

- Animal allergens
- Dust mites
- Cockroach allergens
- Indoor fungi
- Tobacco smoke
All warm-blooded animals produce flakes of skin (dander), feces, urine and dried saliva that can cause allergic reactions.

- Best option - Keep animals out of house
- If you can’t keep the pet outside, keep it out of the bedroom and keep the door shut
- Wash hands and clothes after contact with the pet
- Remove upholstered furniture and carpets from the home or isolate the pet in areas without these items
• Require humidity and human dander to survive, thrive in most areas of the United States but usually not present in high altitudes or arid areas

• High levels are found in bedding, pillows, mattress, upholstered furniture, carpets, clothes and soft toys

**IMPORTANT**: The patient’s bed is the most important source of dust mites that need to be controlled.
• Encase the pillow and mattress in an allergen-impermeable cover.
• Wash all bedding in hot (>130°F) water weekly*.
• Keep humidity below 60% (ideally 30%-50%).
• Remove carpets from the bedroom.
• Avoid sleeping or lying on upholstered furniture.
• In children’s beds, minimize the number of stuffed toys; each week, wash the toys in hot water or freeze them.
• Room air filtration devices are not recommended to control dust mite exposure – the allergens are air-borne only briefly and not removed via air filtration.

(*Exposure to dry heat or freezing kills dust mites but does not remove the allergen.)
• Keep counters, sinks, tables and floors clean and clear of clutter.
• Fix plumbing leaks and other moisture problems.
• Remove piles of boxes, newspapers and other items where cockroaches may hide.
• Seal all entry points.
• Make sure trash in your home is properly stored in containers with lids that close securely; remove trash daily.
• Try using poison baits, boric acid or traps first before using pesticide sprays.
Common Home Triggers: Irritants

- Molds
- Smoke & Gases
- VOCs
- Tobacco smoke

Molds
Basements
Bathrooms
Smoke & Gases
Kerosene heaters
Wood stoves/Fireplaces
VOCs
Hairspray, Cooking spray & odors
Furniture polish
New carpets
Perfumes
Tobacco smoke
Moisture control = mold control, so - ACT QUICKLY.

- If wet or damp materials or areas are dried 24-48 hours after a leak or spill, in most cases mold will not grow.

- Scrub mold off hard surfaces with detergent and water; dry completely.

- Absorbent or porous materials, such as moldy ceiling tiles and carpet, may have to be thrown away.

- Dehumidify basements if possible.

• Minimize exposure to strong odors and sprays (perfume, talcum powder, hair spray, paints, new carpets, particle board).

• Minimize production of nitrogen dioxide\(^C\)
  – Inspect the heating system annually.
  – Inspect and keep clear the chimney clean-out opening.
  – Do not use unvented space heaters.
  – Do not use stoves for heating.
  – Do not use wood burning fireplaces.
  – Use kitchen exhaust fans.
  – Do not let the car idle in the garage.
• If you smoke, ask for ways to help you quit. Ask family members to quit too.

• Do not allow smoking in your home or car.

• Be sure no one smokes at your child’s daycare or school.

• Advocate for smoke free workplaces.

**IMPORTANT**: An estimated 46.5 million adults in the United States smoke cigarettes = 23.25 million deaths.
• Exposure is linked to increased asthma symptoms, decreased lung function and greater use of health services among those who have asthma.

• Message to person with asthma or caregiver – Quit or at least smoke outside (may not adequately reduce exposure).

• Provide smoking cessation support if possible.*
• Vacuum 1-2 times per week
  – Get someone else to do this if possible or wear a dust mask
• Damp mop
• Air conditioning during warm weather recommended for asthma patients*\(^C\)
• Dehumidifiers to reduce house-dust mite levels in high-humidity areas
• HEPA filters to reduce airborne cat dander, mold spores and particulate tobacco smoke.
  – Not a substitute for more effective measures!
• Humidifiers not recommended for use in homes with dust-mite sensitive patients* \(^c\)

• Insufficient evidence to recommend cleaning air ducts in HVAC systems* \(^d\)

• Insufficient evidence to recommend using indoor air cleaning devices
It is recommended that allergen immunotherapy be considered for patients with persistent asthma if evidence is clear of a relationship between symptoms and exposure to an allergen to which the patient is sensitive. *B
Immunotherapy is usually reserved for patients whose symptoms occur all year or during a major portion of the year, and in whom controlling symptoms with pharmacologic management is difficult because the medication is ineffective, multiple medications are required, or the patient is not accepting the use of medication.

(EPR – 3, pg. 173)
Schools: Potential Concerns

- Poor indoor air quality
- Leaky roofs/wet carpeting = Molds
- New carpeting/chemicals = Toxic fumes
- Building repairs/renovations = Dust
- Idling school busses = Diesel fumes
- Unventilated portable classrooms
- Fragrances (Magic Markers, air fresheners, art supplies)
- Animals in classroom
- Cleaning supplies
- Classroom environment (old carpeting, furniture)
- Insecticides, herbicides, fungicides
- Chalk dust, foods
- Access to medications
- Access to a school nurse
It is recommended that a clinician prepare a written asthma action plan for the school setting. In addition to medications and emergency response, this plan should identify factors that make students’ asthma worse so that the school may help avoid exposure.
Gabriel is a five-year-old boy with asthma who will begin kindergarten in the fall. His moderate-persistent asthma has been well managed at home and the family wants to inquire about the environment of the school setting prior to enrollment.

(Source: CDC. How Asthma Friendly Are Your Schools?)
Ask employed patients about possible occupational exposures, particularly upon new-onset of disease.

- Occupational asthma is suggested when there is a correlation between asthma symptoms and work, as well as an improvement when away from work for several days.
- Patient may miss the correlation as symptoms typically present several hours after exposure.
- Serial peak-flow records at work and home can help confirm the association.
Possible Occupational Exposures

Direct Irritants
- Isocyanates
- Metal working fluids
- Coolants
- Chromium salts
- Cleaning agents
- Pesticides
- Welding fumes

Allergic Triggers
- Plicatic acid – red cedar wood dust
- Colophony – soldering fluxes
- Diisocyanates – urethane foam
- Phthallic/trimellitic anhydride – adhesives, paints, varnishes
- Latex, formaldehyde, drugs
• Ask the patient – “Is your asthma consistently worse in spring, summer, fall or parts of the growing season?”

Pollen and Molds

• Avoid areas of high pollution; stay indoors on ozone alert days when possible. *C
• Do not use air cleaners that create ozone. *D

Ozone

*C *D
Viral respiratory infections

- Respiratory infections can exacerbate asthma symptoms, particularly in children under age 10. Rhinovirus, an upper airway pathogen, has been demonstrated in the lower airways in patients with asthma.

Bacterial infections

Infections such as Mycoplasma and Chlamydia may contribute to asthma exacerbations.
Influenza

• Consider inactivated influenza vaccination for patients with asthma.

• Vaccinate due to increased risk of complications from influenza. Do not expect reduced frequency or severity of asthma exacerbations during influenza season.*B

Female hormones and dietary constituents

• There is insufficient evidence to make specific recommendations on these topics.
• **Aspirin sensitivity** – Avoid aspirin and other NSAIDs as these drugs could precipitate severe and fatal exacerbations.  

• **Other medications** – Recommend avoidance of non-selective β–blockers, ACE inhibitors (eye drops used for glaucoma).  

• **Sulfite sensitivity** – Avoid processed potatoes, shrimp, dried fruit, or drinking beer and wine to avoid sulfite exposure.
Exercise-Induced Bronchospasm (EIB)

- EIB should be anticipated in all asthma patients. A history of cough, shortness of breath, chest pain or tightness, wheezing and/or endurance problems during exercise suggests EIB.
Co-morbid Conditions

• If a patient’s asthma cannot be well controlled, evaluate for the presence of co-morbid conditions.

• Evidence suggests that appropriately treated co-morbid conditions can improve asthma control.
Allergic broncopulmonary Aspergillosis\textsuperscript{A}

- Suspect this condition in patients with asthma and a history of pulmonary infiltrates or evidence of IgE sensitization.

Gastroesophageal reflux disease\textsuperscript{B}

- Suspect this condition in patients with poorly controlled asthma, particularly at night, even without other suggestive symptoms.
Obesity*\textsuperscript{B}
• Suggest to asthma patients who are overweight or obese that weight loss may improve asthma control, in addition to improving overall health.

Obstructive sleep apnea*\textsuperscript{D}
• Suggest to asthma patients who are overweight or obese that weight loss may improve asthma control, in addition to improving overall health.
Rhinitis/sinusitis*<sup>B</sup>

- Suspect these conditions in patients with asthma; evaluate the possible presence of symptoms.

Stress, depression and psychosocial factors*<sup>D</sup>

- Suspect these conditions in patients with asthma that is not well controlled. Ask about the potential role of chronic stress or depression in complicating their asthma management.

Pregnancy
Acknowledgements

• Beverly Stewart
  American Lung Association in Oregon
We will breathe easier when the air in every American community is clean and healthy.

We will breathe easier when people are free from the addictive grip of cigarettes and the debilitating effects of lung disease.

We will breathe easier when the air in our public spaces and workplaces is clear of secondhand smoke.

We will breathe easier when children no longer battle airborne poisons or fear an asthma attack.

Until then, we are fighting for air.