



# **Environmental Asthma Triggers: *Current Science and Educational Tools***

Amy MacDonald, MS

Neasha Graves, MPA

UNC Center for Environmental Health and Susceptibility  
Community Outreach and Engagement Core

Produced with a grant from the National Institute of Environmental Health Sciences (P30ES010126).

# What We Do


## Train professionals



## Technical assistance to partners



## Develop educational materials



**GREEN CLEANING**

You can clean your entire house and save money with these basic ingredients:

- **White vinegar:** An antifungal that also kills germs and bacteria.
- **Baking soda:** Eliminates odors and works as a gentle scouring powder.
- **Borax:** Eliminates odors, removes dirt, and acts as an antifungal and possible disinfectant. Use with care around children and pets, as it can be toxic if swallowed.
- **Hydrogen peroxide (3% concentration):** A nontoxic bleach and stain remover.
- **Club soda (fresh):** A stain remover and polisher.
- **Lemon juice:** A nontoxic bleaching agent, grease-cutter, and stain remover.
- **Liquid castile soap:** An all-purpose cleaner, grease-cutter, and disinfectant.
- **Corn meal:** Used to pick up carpet spills.
- **Olive oil:** A furniture polish.

**Why Clean Green?**

US EPA reports that levels of air pollution can be 2-5 times higher inside the home than outside. Using green cleaners is one way to make your air safer to breathe. Find more information on indoor air quality at: [www.epa.gov/iaq/](http://www.epa.gov/iaq/)

For more information on healthy homes, visit [www.nchealthyhomes.com](http://www.nchealthyhomes.com)

### Asthma and Allergy Triggers

#### Mold and Moisture

Molds are everywhere and float through the air inside and outside all of the time. When mold spores land where there is moisture and food, they grow. **Molds can cause allergy symptoms and trigger an asthma attack when breathed in.**

**What Does Mold Need to Grow?**  
Molds grow very easily and need only moisture and to land on a food source to reproduce.

Moisture sources include:

- Leaky pipes
- Leaky roof
- Leaky windows
- Humidity from outside and inside (showers, cooking)
- Spills
- Floods
- Window air-conditioning units


Food sources include:

- Paper products
- Ceiling tiles
- Drywall
- Wall paper
- Insulation
- Carpeting
- Fabrics
- Lignocellulose
- Wood

**Prevent: Keep it Dry Inside**

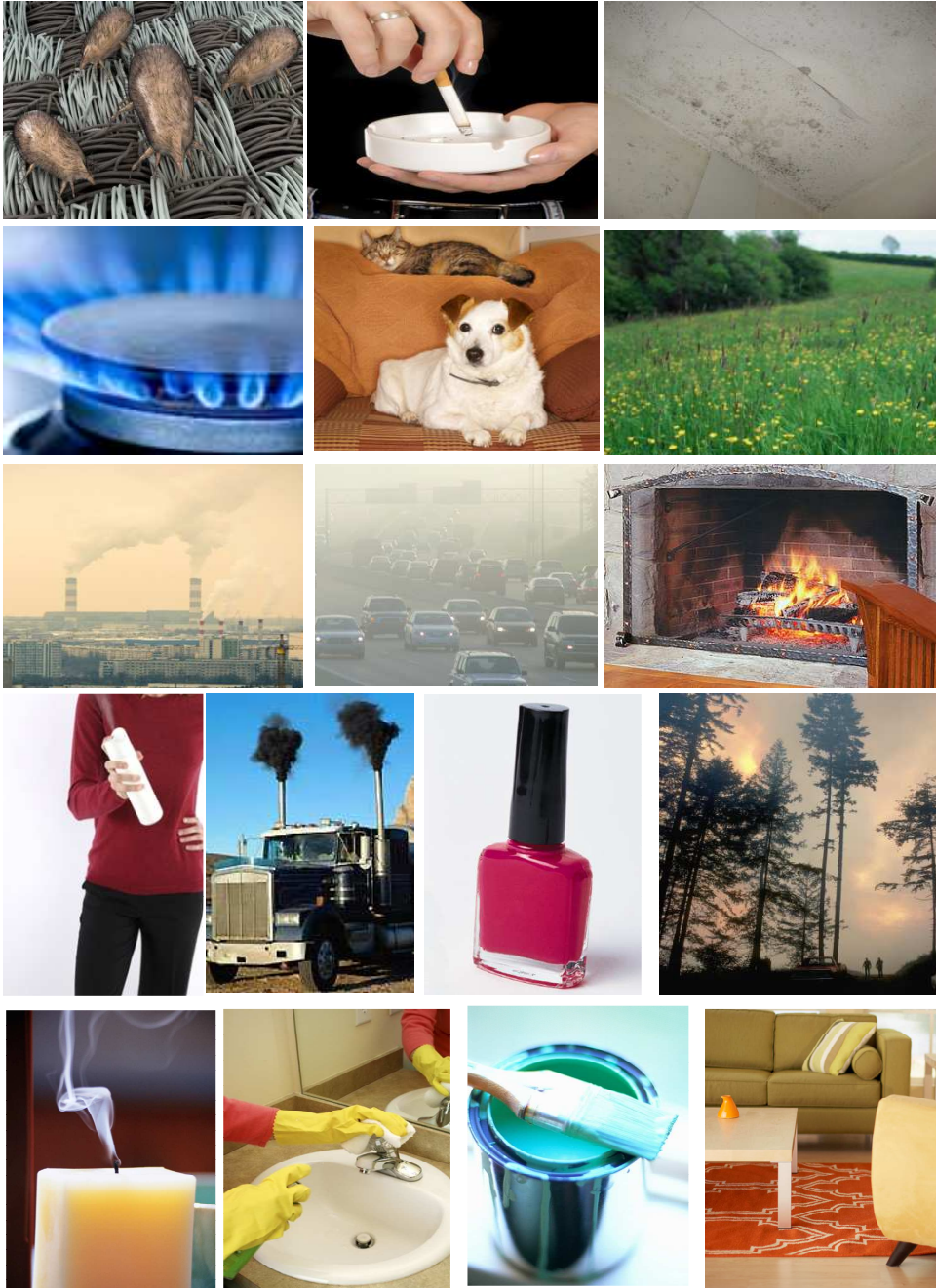
- Prevent mold growth by finding the source of moisture and fixing it. Common places to monitor include around windows, air conditioners, under sinks, and ceiling tiles.
- Keep the humidity of your home between 30-50%. You can purchase a humidity detector for about \$15 at a hardware store or online to help you monitor.
- In damp places like the kitchen and bathroom, use an exhaust fan or open a window to control moisture.
- Wipe down damp surfaces after washing dishes and bathing. Using your air conditioning and helps to keep your home dry.
- Dry water damaged areas and items within 24-48 hours to prevent mold growth. A dehumidifier can help remove moisture from the air.
- Clothes dryers should be vented to the outside, not into the attic or crawl space.

NC Healthy Homes Project



0:21 / 6:31





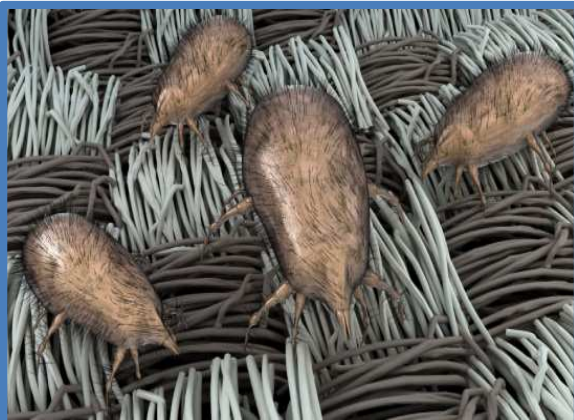
Addressing **all**  
possible  
environmental  
asthma triggers is  
most effective in  
controlling asthma.

*Dr. David Peden, UNC, 2010  
NHLBI Asthma Guidelines, 2007*

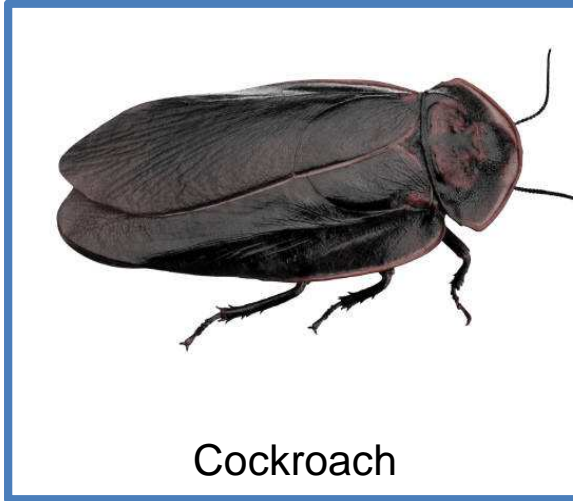


# Indoor Asthma Triggers

# Development of Asthma



Dust Mite



Cockroach

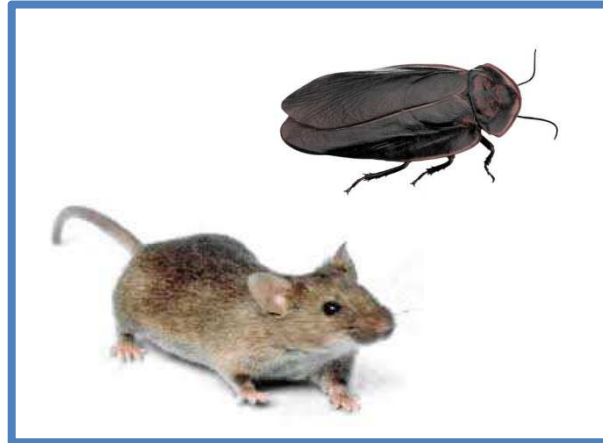


Secondhand Smoke

# Indoor Asthma Triggers



**Dust Mites**



**Cockroach and Pests**



**Secondhand Smoke**



**Unvented Gas Stoves**



**Animal Dander**



**Mold**



# Indoor Asthma Triggers



**Wood Smoke**



**Pollen**



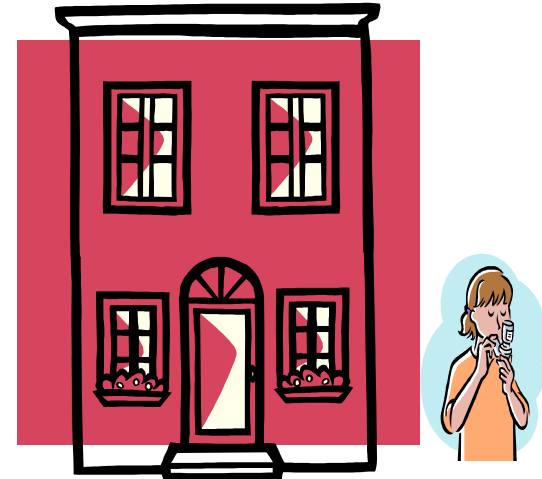
**Chemical Irritants**

# Mold Study

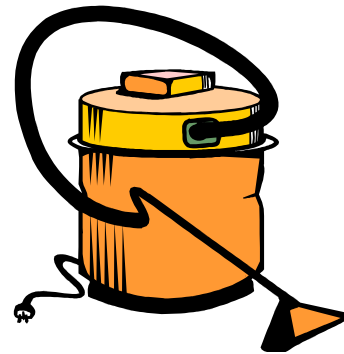
North Carolina:  
19 homes



United States:  
176 homes



More mold  
detected!



## NC:

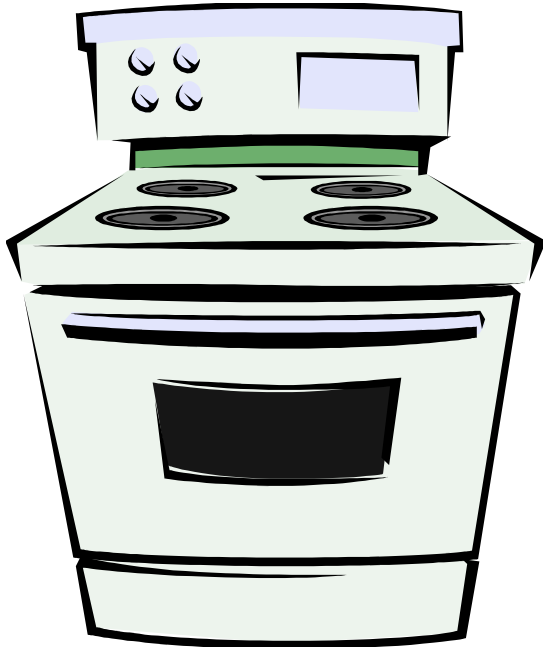
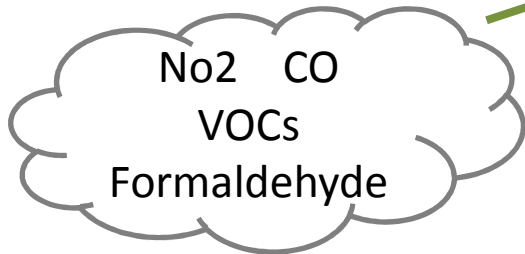
- 20% of participants reported visible mold.
- 74% actually had mold measured from vacuum samples, finding high amounts of different types of mold from water damage.

*-Vesper et al., 2007*



# Unvented Gas Stoves Study

150 Baltimore homes



20 point  
NO2 increase

- 10% more days of coughing
- 15% more days of limited speech/wheezing

-Hansel, 2008

# Humidifiers

“Use of humidifiers and evaporative (swamp) coolers is **not generally recommended** in homes of patients who have asthma and are sensitive to house-dust mites or mold.”

-NHLBI Guidelines, 2007



**Indoor Trigger Solutions:  
*What Patients Can Do***



## Dust Mites

- Use dust mite covers on pillows, mattress, and box springs.
- Keep humidity levels between 30-50% by using a humidity detector (~\$15, purchased at hardware store or online).
- Avoid humidifiers



## Cockroaches and Pests

- Block any entry points to your home.
- Remove sources of food and water for pests.
- Remove clutter and places for pests to hide.
- When necessary, use pesticide bait stations instead of sprays or bombs.

- ✓ **Keep out**
- ✓ **Starve out**
- ✓ **Give no place to hide**



## Secondhand Smoke

- Quit smoking.
- Never smoke in the home or car.
- [www.smokefreehousingnc.com](http://www.smokefreehousingnc.com) provides steps to protect yourself from neighbors' secondhand smoke.



## Animal Dander

- Keep pets out of sleeping areas.
- Vacuum furniture with HEPA vacuum weekly.
- Bathe/groom pet's coat regularly and outside the home.
- Consider finding the pet a new home.



## Mold

- Find the source of moisture and fix it.
- Clean any visible mold with soap and water.
- Use a dehumidifier or air conditioning to keep humidity between 30-50%.
- Use an exhaust fan in the bathroom and kitchen vented to the outside.



## Chemical Irritants

- Limit use and open windows to ventilate.
- Use low-toxic cleaning and personal care products.
- Avoid air fresheners and candles.





## Unvented Gas Stoves

- Use the overhead fan above the stove when a burner is on.
- Be sure the vent goes to the outside, and open a window.
- Never use the stove to keep you warm or heat your house.



## Wood Smoke

- Burn only dry wood.
- Make sure chimneys are clean and working properly.
- Limit use of fireplace and open windows, if possible.



# Outdoor Asthma Triggers

# Outdoor Asthma Triggers



**Factory Pollution**



**Auto and Truck Traffic**



**Wood Smoke**



**Mold**



**Pollen**



# Air Pollution and Asthma Study



Living near a major highway and regular exposure to ozone, PM, and NO<sub>x</sub> can cause asthma and stunt lung growth.

*-Gauderman et al., 2007*

**UNC COEC**  
**Educational Materials**

# Caregiver Study

<1% of children and  
5% of caregivers  
asked questions  
about environmental  
triggers



*-Sleath et al., 2011*



# Education Tools

Do you do **one-on-one** education in a clinic or a home?



## Asthma Trigger Kit



# Education Tools

Do you do home visits?

YES

- **Training: Healthy Homes for Community Health Workers**
- **Asthma Trigger Kit**
- **Resource Guide for Referrals**



# Education Tools

Do you teach  
**community  
workshops?**

YES

## Train-the-Trainer Toolkit

- Power Point presentation
- Hands-on activities
- Evaluation materials





# Fact Sheets

## Asthma and Allergy Triggers

Over 1 million people in North Carolina have been diagnosed with asthma during their lifetimes.

Follow these steps to prevent or eliminate indoor and outdoor asthma and allergy triggers.



### DUST AND DUST MITES

- Use a doormat. Remove shoes when entering the home.
- Replace blinds with washable curtains, where possible, or regularly wipe down blinds to remove dust.
- Remove dust often with a damp cloth.
- Cover mattresses and pillows with dust mite proof zippered covers.
- Wash bedding (sheets, pillow cases, blankets, and bedcovers) every week in hot water.
- Use vacuum, carpet and fabric sanitizer

### CHEMICAL IRRITANTS

- Don't allow smoking in your home or car
- Get help for yourself or family to quit smoking by providing tobacco education literature and materials.
- Keep fireplaces, gas stoves and furnaces regularly serviced. Increase ventilation when using them.
- Read labels and follow directions when

## Getting Rid of Pests

### 1. Keep Pests Out

- Look for entry points to your home and seal all cracks and holes. Use caulk, copper mesh, duct tape, door sweeps, etc.

### 2. Remove Food and Water

- Check for leaking pipes and make needed repairs.
- Remove pet bowls immediately after pets eat and drink.
- Clean dirty dishes by the end of the day, store food in sealed containers, and clean up spills quickly.
- Use a trash can with a tight lid and take the trash out often. Store trash and recycling away from the home.



### 3. Clean and Reduce Shelter

- Clean all surfaces with soap and water to wash away any waste pests have left behind. Vacuum any body parts you see.
- Get rid of clutter and throw away unneeded cardboard.
- Keep cupboards organized so you can see signs of pests.



### 4. Treat Problem Safely

- Avoid using pesticide sprays, foggers, and bug bombs which

## NORTH CAROLINA HEALTHY HOMES

### GREEN CLEANING

You can clean your entire house and save money with these basic ingredients:

- **White vinegar:** An antifungal that also kills germs and bacteria.
- **Baking soda:** Eliminates odors and works as a gentle scouring powder.
- **Borax:** Eliminates odors, removes dirt, and acts as an antifungal and possible disinfectant. Use with care around children and pets, as it can be toxic if swallowed.
- **Hydrogen peroxide (3% concentration):** A nontoxic bleach and stain remover.
- **Club soda (fresh):** A stain remover and polisher.
- **Lemon juice:** A nontoxic bleaching agent, grease-cutter, and stain remover.
- **Liquid castile soap:** An all-purpose cleaner, grease-cutter, and disinfectant.

#### Why Clean Green?

US EPA reports that levels of air pollution can be 2.5 times higher inside the home than outside. Using green cleaners is one way to make your air safer to breathe. Find more information on indoor air quality at: [www.epa.gov/iaq/](http://www.epa.gov/iaq/)

## Asthma and Allergy Triggers

### Chemical Irritants

Asthma symptoms may be worse around products such as cleaners, paints, glues, pesticides, cosmetics, or air fresheners. Large amounts can stay in the air long after you have used them. Any steps you take to reduce the amount of chemical irritants in your home will make your home healthier.



#### Health Effects

- Eyes, nose, and throat irritation
- Headaches
- Loss of coordination
- Nausea
- Damage to liver, kidney, and central nervous system
- Asthma trigger



Read product labels and look for phrases such as DANGER, WARNING, and CAUTION. Keep these products out of reach of children.

#### Avoiding Chemical Irritants

- **Keep the air moving** in your home opening doors and windows to let in fresh air.
- Use **less-toxic products** (like greener cleaners) or stop using irritating products altogether.
- **If you must use a chemical irritant:**
  - ✓ Make sure a person with asthma is not around.
  - ✓ Open windows and doors to ventilate.
  - ✓ Follow instructions on the label so you use too much.
- When possible, allow new furniture, rugs to air out outside of the hot hours. Always open doors and windows when bringing in materials that are "new" to ventilate.

## Asthma and Allergy Triggers

### Outdoor Air Pollution

Children and people with asthma should not play or do other outside activities on days when the air is hazardous to avoid aggravating asthma and allergies. Take these steps to protect yourself and others.



#### Check Air Quality Forecasts

These forecasts alert you to pollutants in the air that can make symptoms worse or trigger an asthma attack.

- Particulate matter pollution created by factories, coal-fired power plants, and truck exhaust can damage the lungs, heart, and blood vessels.
- Ground-level ozone forms when air pollutants combine in not sunlight. Ozone levels are highest from early afternoon to early evening (about 2 to 6 p.m.) on hot, sunny days.
- Smoke from wildfires is a mixture of gases and fine particles from burning trees and plants.

Air Quality	AQI
Good Code Green	0-50
Moderate Code Yellow	51-100
Unhealthy for Sensitive Groups Code Orange	101-150
Unhealthy Code Red	151-200

#### Check Pollen Counts

Asthma Action Plan

## Asthma and Allergy Triggers

### Mold and Moisture

Molds are everywhere and float through the air inside and outside all of the time. When mold spores land where there is moisture and food, they grow. Molds can cause allergy symptoms and trigger an asthma attack when breathed in.



#### What Does Mold Need to Grow?

Molds grow very easily and need only moisture and to land on a food source to reproduce.

#### Moisture sources include:

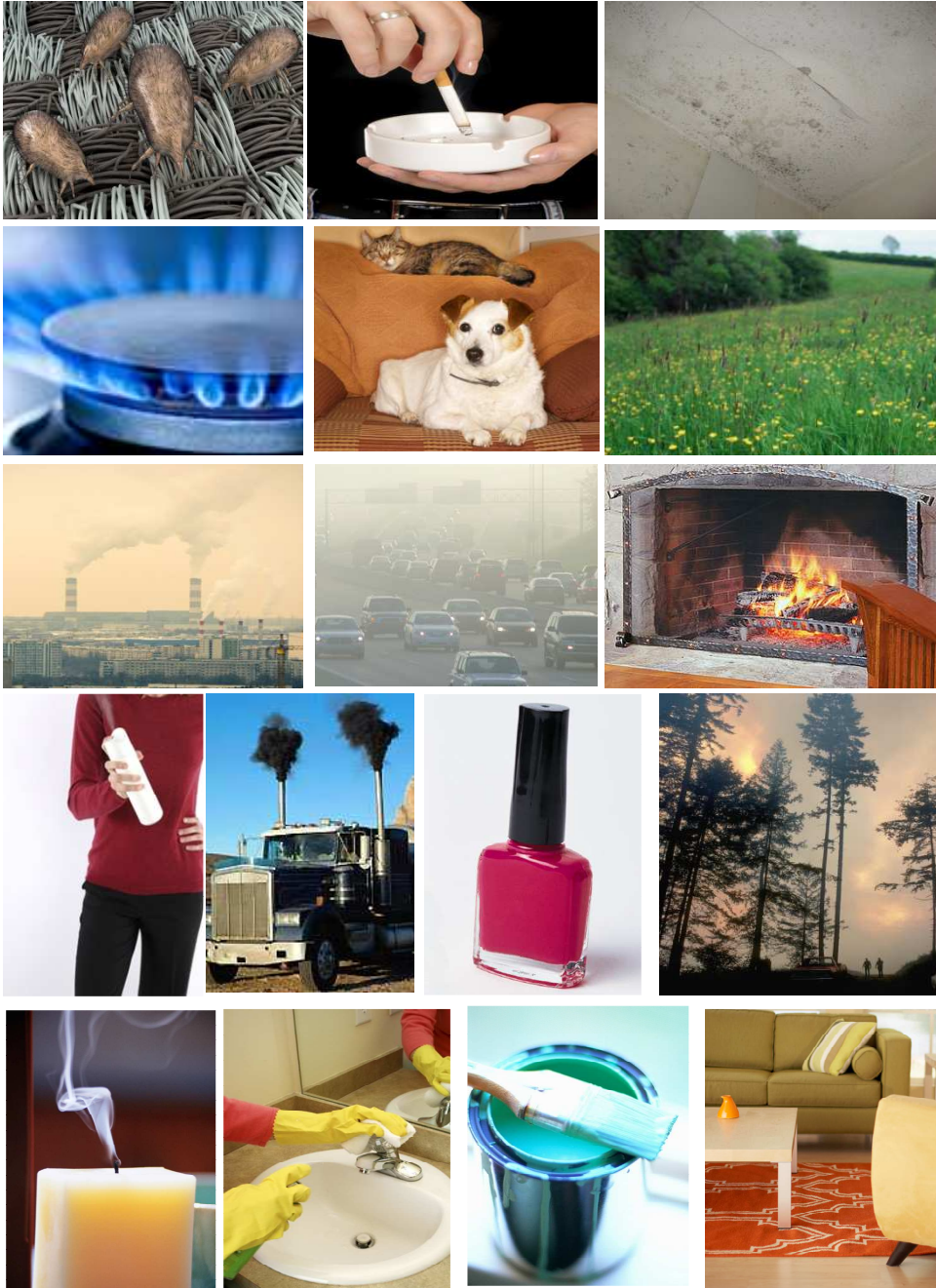
- Leaky pipes
- Leaky roof
- Leaky windows
- Humidity from outside and inside (showers, cooking)
- Spills
- Floods
- Window air-conditioning units

#### Food sources include:

- Paper products
- Ceiling tiles
- Drywall
- Wall paper
- Insulation
- Carpeting
- Fabric

#### Prevent: Keep it Dry Inside

- Prevent mold growth by finding the source of moisture and fixing it. Common places to monitor include around windows, air conditioners, under sinks, and ceiling tiles.
- Keep the humidity of your home between 30-50%. You can purchase a humidity detector for about \$15 at a hardware store or online to help you monitor.
- In damp places like the kitchen and bathroom, use an exhaust fan or open a window to control moisture.
- Wipe down damp surfaces after cooking, washing dishes and bathing. Using your



Addressing **all**  
 possible  
 environmental  
 asthma triggers is  
 most effective in  
 controlling asthma.

*Dr. David Peden, UNC, 2010  
 NHLBI Asthma Guidelines, 2007*





Amy MacDonald  
(919) 966-2463  
amy.macdonald@unc.edu

Developed by:

