Asthma Triggers in Sensitive Environments
Indoor Air Quality (IAQ) and Health

- Poor indoor air quality can trigger asthma and other health problems
- Sources of biological pollutants that can affect indoor air quality:
  - Polluted outdoor air coming indoors
  - Human viruses and bacteria
  - Animal allergens
  - Indoor surfaces and water reservoirs where mold and bacteria can grow (i.e. humidifiers, components of HVAC system)
Health Consequences of Poor Indoor Air Quality

- Biological agents in indoor air are known to cause three types of human disease:
  - Infections (pathogens invade human tissues)
  - Hypersensitivity diseases (specific activation of immune system causes disease)
  - Toxicosis (biological toxins cause direct toxic effects)
Health Consequences of Poor Indoor Air Quality

- Short-term health effects of pollutants:
  - Asthma and wheezing attacks
  - Sinus congestion, sneezing, nose itching, coughing
  - Headache, fatigue, and shortness of breath
  - Eye, nose, throat, and skin irritation
  - Dizziness and nausea
Health Consequences of Poor Indoor Air Quality

- Long-term health effects of pollutants:
  - Respiratory diseases
  - Heart disease
  - Kidney disease
  - Lung cancer
Why the Concern about Asthma?

- It’s a serious lung disease
  - Airways constrict making it difficult to breathe
- Children and adults are susceptible; leading cause of long-term illness in children
- Asthma episodes result in missed days and increases in medical costs
Why the Concern about Asthma?

- NE is in top 1/3 among states for asthma death rates/capita in the U.S.
- It’s the most common chronic childhood disease, affecting about 4.8 million children.
Asthma Triggers

- Allergens and Irritants include:
  - Molds and other Fungi
  - Dust and Dust Mites
  - Pet Dander, Saliva
  - Cockroaches, Mice, and Rats
  - Pollen
  - Chemicals and Volatile Organic Compounds (VOCs)
  - Secondhand Smoke and Combustion Products
Mold Basics

Mold is a fungi that lives on plant and animal matter. To survive, it requires:

- Moisture source
- Food (organic materials)
- Oxygen

Mold is a pest!

Photo: University of Nebraska–Lincoln
Mold as a Pest

- Prefers warm, humid, dark places
- Feeds on damp organic materials
  - Wood, paper, carpet, soil, and other materials
- Studies link indoor mold and dampness to respiratory problems (especially allergies and asthma)
Preventing Mold

- Reduce moisture
- Repair leaks
- Maintain low indoor humidity (less than 50%)
- Vent moisture-generating appliances (bathroom and shower vents, dryers, etc.) to the outside
Managing Mold

- Clean surfaces with detergent and water, and dry completely as first line of attack.
- Mold remediation to contain and clean larger mold infestations.
- Fix water problems and develop maintenance plan.
Mold Resources

- See the following learning module to get more details about this pest:
  - Mold and Indoor Air Quality in Sensitive Environments

Photo: University of Nebraska–Lincoln
Dust

- Contains more than 5,000 ingredients including molds, fibers, dust mite allergens, skin flakes, insect body parts, dander, soil, bacteria, and smoke residues.
Managing Dust

- Use smooth, easy to clean surfaces and washable items in school
- Damp-clean to remove dust without it becoming airborne
- Use vacuums with HEPA filters
- Use high efficiency filters in HVAC systems
- Change or clean heating or cooling system filters as directed by manufacturer
- Use high quality mats at the inside and outside of entrances
- Remove old carpet that has deeply embedded dust and other materials
Dust Mites

- Dust mites common trigger of asthma
- Live on skin flakes in warm, humid places and soft furnishings such as carpets, stuffed animals, clothes, and furniture

Drawing: Nebraska Extension in Lancaster County
Managing Dust Mites

- Maintain humidity levels below 50% to help reduce the population.

- In schools or daycares, wash all mats, stuffed toys, and bedding in hot water each week. Avoid mats or furnishings that are more difficult to clean.

- Use hard, smooth surfaces where possible.
Managing Dust Mites

- Remove clutter and keep toys that can be easily washed. Some can be put in freezer overnight to reduce dust mites.
- Damp-clean surfaces; steam clean carpets and dry well within 24 hours.
- Clean and vacuum used upholstered furniture on a regular basis.
Classroom pets in schools and daycares can trigger asthma

- Skin flakes, saliva, and urine can be triggers
- Rodents and cats are more common triggers than dogs
Managing Classroom Pets

- Clean classrooms where pets are kept
- Keep pets away from furniture, stuffed toys, and carpeting
- Isolate pets in a confined area of the classroom
- Keep pets that are less likely to be asthma triggers (i.e. non furred or feathered)
Cockroaches and Rodents

- Cockroach exposure aggravates asthma in people allergic to them.
- Body parts, hairs, saliva, and excrement are triggers.
- A National Institutes of Health/National Institute of Environmental Health Sciences study reported that cockroach allergens worsen asthma symptoms more than pet allergens or dust mites.
Managing Cockroaches and Rodents

- Seal food and garbage in airtight, non-chewable containers
- Clean up all food crumbs and spilled liquids right away
- Keep areas clean where food is stored, eaten, and prepared, including snack areas
Managing Cockroaches and Rodents

- Wash dishes and food surfaces soon after use
- Limit food consumption in non-cafeteria areas
- Repair leaks and other moisture problems
- Dispose of cardboard boxes and clutter
- Seal openings around water pipes and other places where pests can enter around doors, cabinets and windows
Managing Cockroaches and Rodents

- Empty trash and remove from building daily
- Caulk and/or weather strip entry points
  - Holes, cracks, crevices
- Fix screens and windows
- Use Integrated Pest Management principles
Managing Cockroaches and Rodents

- Use least toxic products
- Limit treatment area and provide plenty of ventilation
- Keep asthmatics out of the treated area
- Read and follow label instructions carefully!
Cockroaches and Rodents Resources

- See the following learning modules to get more details about these pests:
  - Cockroach Management
  - Mice and Rats in and around Sensitive Environments

Photo: University of Nebraska–Lincoln
Pollen from Plants

- Many plants cause allergy symptoms
  - Symptom appearance depends on time of bloom and pollen production; may include ragweed, grasses, and pine, birch, or oak trees
- Some people suffer from allergic rhinitis ("hay fever")
Managing Pollen

- Plan landscaping carefully to avoid known problematic pollen producing plants
- Pollen transported by wind; may enter buildings through doors, windows, cracks, and on clothing
- Place quality mats at every entrance inside and out to trap pollen on shoes
  - At least 12 walking steps
Managing Pollen

- Use quality doors, windows, and screens. Fix holes in screens
- Caulk and weather strip to seal areas around windows
- Run air conditioning and keep doors and windows closed during peak pollen shedding times
- Use vacuum with HEPA filter
- Damp-clean surfaces
Volatile Organic Compounds (VOCs)

- VOCs evaporate from:
  - Adhesives
  - Solvents
  - Cleaners
  - Personal products, perfumes, air fresheners
  - Pesticides
  - Paints
  - Art supplies
  - Chemistry class supplies
  - New materials
    - Carpet, cabinets, etc.
Managing VOCs

- Choose water-based and non-aerosol products or those labeled as low or no VOCs

- Keep caps and lids tight
  - Store away from students, residents, and staff, in separate building if possible

- Avoid using around known asthmatics

- Select low VOC containing materials
  - i.e. No formaldehyde

- Choose unscented products
Secondhand Smoke and Combustion

These pollutants can come in through the ventilation system and linger on walls and surfaces long after the source is gone.

- Cigarette smoke
- Combustion (from gas furnaces, water heaters, etc.)
- Exhaust (from buses, cars, etc.)
Secondhand Smoke

- Aggravates asthma symptoms
- Risk factor for new asthma cases
- Is likely to cause respiratory and other illnesses such as bronchitis, pneumonia, and ear infections
- Prohibit smoking inside facilities or other sensitive areas
Combustion

- Aggravates breathing problems in asthmatics
- Includes soot, smoke, and gases such as sulfur dioxide and nitrogen dioxide
Managing Combustion

- Service heating and cooling equipment annually
- Provide adequate exhaust and intake ventilation to combustion equipment
- Use hood ventilators when cooking
- Limit/avoid use of wood-burning items, kerosene heaters, and candles
- Do not burn yard waste near sensitive environments
Managing Combustion

- Minimize bus idling time near entrances or HVAC intake vents to reduce hazardous diesel fumes and emissions
- Block intake of exhaust fumes
  - Keep doors and windows closed near bus loading areas
Additional Resources

- Asthma and Allergy Foundation of American
  - [http://www.aafa.org](http://www.aafa.org)
  - 1-800-7ASTHMA

- American Lung Association
  - [http://www.lungusa.org](http://www.lungusa.org)
  - 1-800-586-4872
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