Healthy Indoor Air:
Improve Indoor Air Quality and
Reduce Asthma Triggers

Metro East Air and Health Forum

US Environmental Protection Agency
Outline

• Intro to Indoor Air Quality
• Volatile Organic Compounds (VOCs)
• Radon
• HVAC
• Asthma
• Remediation
Indoor Air Quality (IAQ) Introduction

• IAQ v. IEQ
• Americans spend about 90% of their day indoors - in classrooms, in offices, at home.
• Pollution indoors is 2-5X (and occasionally more than 100X) higher than outdoor levels.
• Indoor air pollution is consistently ranked among the top environmental health risks facing the American people.
Indoor Air Quality (IAQ) Introduction

• Sick Building Syndrome
  – Acute health and comfort effects that appear to be linked to time spent in a building.
  – Specific illness or cause cannot be identified.
  – Complaints may be localized in a particular area or may be widespread.

• Building Related Illness
  – Symptoms of diagnosable illness are identified and can be attributed directly to airborne building contaminants.
  – i.e. Legionella
Dampness and Health

- Influences mold and microbial growth.
- Attracts pests.
- May initiate the release of chemical emissions from damaged building materials and furnishings.
- Associated with upper respiratory tract symptoms, like coughing, wheezing, and asthma.
- 40-60 % relative humidity
Volatile Organic Compounds (VOCs)
Common Indoor Sources

- New Carpeting
- Fresh Paint
- Furniture
- Building Materials
- Air fresheners & Scented Candles
- Perfumes & Deodorants
Radon

• Naturally occurring radioactive gas
• Member of Uranium decay series
• Undetectable with senses
• Can have high concentrations indoors
• Cause of more than half US Radiation Exposure
Radon is the leading cause of lung cancer among non-smokers, and is the second leading cause of lung cancer in America.
Radon is a natural cancer-causing radioactive gas that you can’t see, smell or taste.

RADON GETS IN THROUGH:
1. Cracks in solid floors
2. Construction joints
3. Cracks in walls
4. Gaps in suspended floors
5. Gaps around service pipes
6. Cavities inside walls
7. The water supply
What Causes IAQ Problems?

• Indoor pollution sources that release gases or particles into the air are the primary cause of indoor air quality problems.
• High temperature and humidity levels can also increase concentrations of some pollutants.
• Inadequate ventilation can increase indoor pollutant levels.
Intro to Heating, Ventilation, and Air Conditioning (HVAC) Systems

• Purpose is to provide comfort & health
• Problems can be caused by and solved by HVAC
Intro to HVAC Systems

• Heating usually involves combustion.
• Modern buildings are built “tight” to conserve energy.
• Large buildings depend on mechanical ventilation to bring in outside air.
Intro to HVAC Systems
Asthma

- Asthma is a potentially life threatening, chronic disease of the lungs’ airways causing recurring episodes of breathing problems.
- It can’t be cured, but can be controlled.
- It can develop at any age.
- It is not contagious.
What Happens During an Asthma Episode?

• The lining of the airways becomes narrow and easily irritated due to inflammation.
• The airways produce a thick mucus.
• The muscles around the airways tighten and make airways narrower.
Common Asthma Symptoms

- Cough
- Wheeze
- Shortness of breath
- Chest tightness
- Fatigue
Asthma Statistics

- 2011, afflicts more than 26M, including 7M kids
- 2009, 1.9 M ER visits
- 2010, over 3400 deaths
- Accounts for more than 13M missed school days and 14M missed work days annually
- Costs $56B annually
- Significant disparities

Source: http://www.cdc.gov/asthma/
Common Asthma Triggers

• **Allergens**
  – *molds*, *dust mites*, *pests* (cockroaches, rodents), *animal dander*, pollens, foods, medications

• **Irritants**
  – *tobacco smoke*, strong odors, aerosols, VOCs, ozone, particulate matter, nitrogen dioxide

• **Other**
  – Viral respiratory infections
  – Changes in weather
  – Exercise
  – Endocrine factors
  – Strong emotional reactions

* 5 major indoor asthma triggers
Work-Related Asthma

• 15% of U.S. adults with asthma have asthma attributable to occupational factors
• Work-aggravated asthma - preexisting or concurrent asthma worsened by factors related to the workplace environment
• Occupational asthma - new onset asthma attributed to the workplace environment
Components of Asthma Management

Medical Management of Asthma
– Diagnosis
– Treatment
– Patient / Parent education

✔ Environmental Management of Asthma
– Improving awareness & education
– Reducing indoor triggers and limiting exposure to outdoor air triggers
Controlling Asthma in the Workplace

Employees

• Report respiratory symptoms related to the workplace to employer
• Report problems that may affect IAQ
• Eliminate or avoid known triggers
• Take care of your asthma
Controlling Asthma in the Workplace

Employers

• Follow federal and state health & safety guidelines
• Encourage non-smoking in the workplace
• Provide training and resources
• Establish programs to identify people with asthma and to prevent exposure to asthma
Remediation

• Water Damage: Moisture control
• Mold Remediation:
  – Cleaning v. Removal
• Engineering Controls
• Source Control
• Air Cleaning
Duct Cleaning

• Has never been shown to actually prevent health problems.

• Consider cleaning air ducts if:
  1. There is substantial visible mold growth inside hard surface ducts or other parts.
  2. Ducts are infested with pests.
  3. Ducts are clogged with excessive amounts of dust and debris and/or particles are actually released from your supply registers.
Communication

• Communication is the first step to improving indoor air quality and managing work related illnesses like asthma.

• Employee ↔ employee
• Employer ↔ employee
Conclusion

• Good indoor air quality is important to everyone’s health at work and at home.
• Good IAQ is everyone’s responsibility.
• Asthma is a serious chronic condition of the lungs that is affected by IAQ.
• Communication is the key.
Questions

• http://www.epa.gov/iaq/
• http://www.epa.gov/asthma/
• http://www.epa.gov/smokefree/healtheffects.html
• http://www.epa.gov/iaq/pubs/index.html

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