

# Clearing the Air: Asthma and Indoor Air Exposures



- Institute of Medicine report on what is known about indoor air exposures and asthma
  - Exposures and asthma onset
  - Exposures and worsening asthma
  - Effectiveness of interventions
- 12 person expert panel convened in late 1998, final report issued January 2000
- <http://books.nap.edu/books/0309064961/html/>





# Exposures Addressed in IOM Report

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## ■ Biological

- Animals
  - Cats / dogs / rodents / cows / horses / birds
- Cockroaches
- House dust mites
- Endotoxin
- Fungi
- Plants
- Pollens
- Infectious agents

## ■ Chemical

- NO<sub>x</sub>
- Pesticides
- Fragrances
- Plasticizers
- VOCs
- Formaldehyde
- Environmental tobacco smoke
- Ozone / PM / SO<sub>x</sub>



# Classification Scheme of IOM Report

- Distinction between *development* of asthma and *exacerbation* of asthma
- Categories of evidence
  - Sufficient evidence of a causal relationship
  - Sufficient evidence of an an association
  - Limited or suggestive evidence of an association
  - Inadequate or insufficient evidence to determine
  - Limited or suggestive evidence of no association



# Exposures Associated With Exacerbation of Asthma

- Sufficient evidence of a causal relationship
  - Environmental tobacco smoke (preschool aged children)
  - Cat / Cockroach / House Dust Mite
- Sufficient evidence of an association
  - Dog / Fungi – Molds / Rhinovirus
  - NO<sub>x</sub> / NO<sub>2</sub>



# Exposures Associated With Exacerbation of Asthma

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- Limited or suggestive evidence
  - ETS (other than preschoolers) / formaldehyde / fragrances
  - Birds / *C. pneumoniae* / *M. pneumoniae* / RSV
- Inadequate evidence
  - Pesticides / Plasticizers / VOCs Everything else

# Exposures Associated With Development of Asthma



- Sufficient evidence of a causal relationship
  - House Dust Mite
- Sufficient evidence of an association
  - Environmental tobacco smoke (preschool aged children)
- Limited or suggestive evidence
  - Cockroach (infants) / RSV
- Inadequate evidence
  - Everything else
- Limited or suggestive evidence of no association
  - Rhinovirus (adults)



# Sufficient Evidence of an Association for Mitigation Strategies for House Dust Mite

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- Humid climates
  - Air conditioning for humidity control
  - Reduce nests / bedding measures
- Moderately or seasonally humid
  - Open windows / upper floor apartment
  - Reduce nests / bedding measures / chemical treatment
- Dry areas
  - Daily ventilation

# Limited Evidence for Effectiveness of Mitigation Strategies for Cockroach Exposure



- Combination of extermination and control of allergen reservoirs
- Extermination alone ineffective; cleaning alone ineffective





# Limited Evidence for Effectiveness of Mitigation Strategies for Cat Exposure

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- Remove cat
  - May also require removal of reservoirs of allergen to be effective
- Washing cat



# Effectiveness of Mitigation Strategies for Reducing ETS and Chemical Exposure

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- Smoking cessation
- Air cleaning
  - Technologically capable of reducing concentrations
- Increasing ventilation
  - Technologically capable of reducing concentrations



# Research Recommendations, IOM Asthma Report

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- Exposure
  - Prenatal exposures
  - Assessment of age at first exposure
  - Importance of gene – environment interaction
- Strategies to reduce exposure
  - Rigorous mitigation trials
  - Importance of considering target population
- Integration of health and healthy environment sciences