



# Studies on the Relationship Between Asthma Emergency Department Visits and Ozone



Presented by  
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## What is Asthma?

- ❖ Chronic Inflammation of the Airways
- ❖ Symptoms
  - ❖ Coughing
  - ❖ Wheezing
  - ❖ Shortness of Breath
  - ❖ Chest Tightness



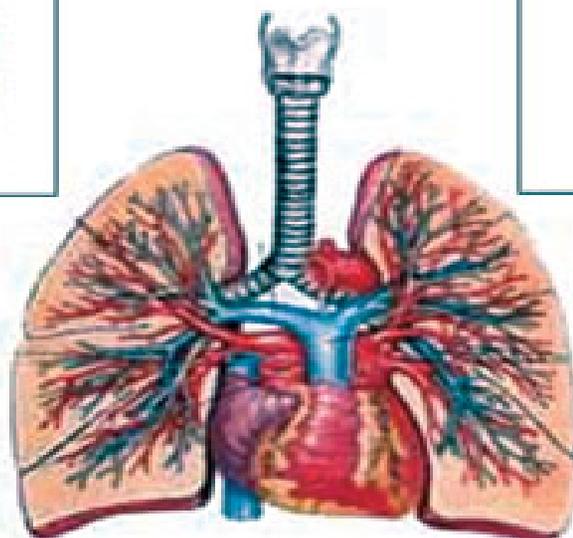
# Normal and Asthmatic Lung



Normal



Asthmatic



## What is Ozone?

O<sub>3</sub>

- ❖ An invisible irritant gas
- ❖ Good up high // Bad nearby!
- ❖ NO<sub>x</sub> + VOCs + heat +



O<sub>3</sub> → Ozone (O<sub>3</sub>)

- ❖ Sources of NO<sub>x</sub> + VOCs primarily from motor vehicles, electric power plants and industry

O<sub>3</sub>

O<sub>3</sub>

# What are the Health Effects of Ozone?

- ❖ A powerful respiratory irritant
- ❖ Reduced lung capacity
- ❖ Asthma attacks
- ❖ Increased ER visits  
and hospital admissions
- ❖ Increased school absenteeism
- ❖ May cause development of asthma



# People Most Affected by Ozone

- ❖ Older Adults
- ❖ People with chronic lung diseases
- ❖ Children
- ❖ Health adults who work or exercise outdoors
- ❖ People who are more sensitive to ozone



# Conclusions From Epidemiologic Studies



## Atlanta Georgia

- ❖ Air quality and emergency room visits for asthma in children
  - ❖ Summers of 1993 – 1995 in Atlanta Georgia
  - ❖ ↑ ozone levels → ↑ pediatric ER visits
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- ❖ During Atlanta Summer Olympics, decreased traffic reduced asthma exacerbation in children

Tolbert, P. E., et al 2000 Air quality and pediatric emergency room visits for asthma in Atlanta, Georgia, American Journal of Epidemiology, vol. 151, no. 8 p. 798-810



# Conclusions From Epidemiologic Studies

## Cincinnati, Ohio

- ❖ Relationship of outdoor air quality to childhood asthma attacks
- ❖ ER visits for asthma and hospital admissions for status asthmaticus from April to October; 1996 and 1997
- ❖ No association between asthma visits and the ozone concentration

Lierl, M.B., et al 2003, Relationship of outdoor air quality to pediatric asthma exacerbations, *Annals of Allergy, Asthma, & Immunology*, vol. 90, p 19-31

# Conclusions From Epidemiologic Studies



## California Central Valley

- ❖ Relationship between air pollution and respiratory diseases among Kaiser Permanente membership in the Central Valley of CA
- ❖ Hospitalizations and emergency department visits from January 1996 to December 2000
- ❖ Asthma hospitalizations and ER visits decreased when ozone levels increased

Particulate Air Pollution and Morbidity in the California Central Valley: A High Particulate Pollution Region, Kaiser Permanente, Northern California Region, Contract No. 97-303, Stephen K. Van Den Eeden, July 12, 2002

# Conclusions From Epidemiologic Studies



## Children's Health Study

- ❖ Children living in high O<sub>3</sub> communities who actively participate in several sports are more likely to develop asthma than children in those communities not participating in sports
- ❖ Days with higher O<sub>3</sub> levels resulted in significantly higher school absences due to respiratory illnesses
- ❖ Children living in communities with higher concentrations of acid vapor, O<sub>3</sub> NO<sub>2</sub> and PM have significantly reduced lung growth and development