

Childhood Asthma & Exposure to Traffic

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Air Resources Board



California Environmental Protection Agency

Background



Deaths Associated with Traffic

- ◆ **Dutch** - living near roadways doubled the risk of death from heart or lung disease

Prenatal Impacts

- ◆ **Los Angeles** - infants born to women living near high traffic areas increased risk of premature birth and low birth weight

Cardiovascular Effects

- ◆ **North Carolina** - PM exposure in cars is associated with cardiovascular effects in young men

Children & Respiratory Effects

- ◆ **Bay Area** - children in schools nearby freeways have more respiratory symptoms

Introduction



- ◆ Previous studies many in Europe
- ◆ A growing body of literature from the US
- ◆ Different indicators used for traffic
- ◆ Compare and validate traffic indicators
 - same study subjects
- ◆ Today's Study:
 - Gauderman WJ, et al. "*Childhood Asthma and Exposure to Traffic and Nitrogen Dioxide*". *Epidemiology*, 16:737-743, 2005.

Population



- ◆ 208 children - from 10 Southern California cities
 - 15 % of children had asthma
 - USC-led Children's Health Study



Methods



MEASURED

- ◆ Distance from nearest freeway to child's home
- ◆ Volume of vehicles 150 meters from home
- ◆ NO₂ samplers outside homes

MODELED AT EACH CHILD'S HOME

- include weather conditions, vehicle counts
- ◆ Modeled freeway pollution
- ◆ Modeled non-freeway road pollution

POTENTIAL CONFOUNDERS

- ◆ Included gas stove, maternal smoking, and ETS

Results



<i>Outcome</i>	<i>Measured NO₂</i>	<i>Distance to Freeway</i>	<i>Modeled Freeway</i>
Asthma Prevalence	1.83 (1.04-3.22)	1.89 (1.19-3.02)	2.22 (1.36-3.63)

Evaluation of Traffic Indicators



- ◆ Estimates of freeway indicators were strongly correlated with measured NO_2 at home
- ◆ NO_2 a product of combustion engines

Correlation Between Traffic Indicators & NO_2



* Absolute value, as NO_2 is negatively correlated with distance of home to the freeway.

Summary of Results



- ◆ Higher asthma prevalence near freeways
- ◆ Proximity to freeways linked with increased wheezing & asthma medication use
- ◆ Freeway traffic has a strong influence on NO_2 concentrations at homes
- ◆ A traffic indicator - NO_2

ARB Ongoing Traffic Studies



Children

- ◆ Traffic-Related Air Pollution and Asthma in Economically Disadvantaged and High Traffic Density Neighborhoods in Los Angeles County, California
- ◆ Traffic Pollution and Children's Health: Refining Estimates of Exposure for the East Bay Children's Respiratory Health Study

Elderly

- ◆ Cardiovascular Health Effects of Fine and Ultrafine Particles during Freeway Travel
- ◆ Air Pollution and Cardiovascular Disease in the California Teachers Study Cohort

Concluding Remarks



- ◆ Traffic air pollution associated with asthma in children
- ◆ Freeway a major pollution source in a community
- ◆ Continued research on traffic effects