

Asthma Onset and Exacerbation in Children Exposed to Traffic-Related Air Pollution

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California Air Resources Board

California Environmental Protection Agency

Impacts of Air Pollution on Asthma

- Asthma – leading cause of chronic illness
 - 16% of California children are asthmatics
 - \$500 million annual cost for asthma treatment
- Air pollution can worsen asthma
 - 280,000 asthma exacerbation and lower respiratory symptoms
 - Traffic pollutant exposure associated with asthma

Air Pollution and Asthma Onset

- Can ambient air pollution be linked to asthma onset (newly-diagnosed cases of asthma)?

Southern California Children's Health Study

- 10+ year study followed 6,000 children's chronic exposures to air pollution
 - Community monitoring (PM_{2.5}, PM₁₀, constituents of PM, O₃, NO₂ and acid vapor)
- Landmark study on children's health effects
- Adverse effects on lung function growth, asthma, school attendance
- 100+ publications



Asthma Onset and Traffic Pollution

Methods

- 217 children from 11 communities in the Southern California Children's Health Study
- New asthma cases reported annually through questionnaire during the 8-year follow-up
- NO₂ monitored as a marker for traffic

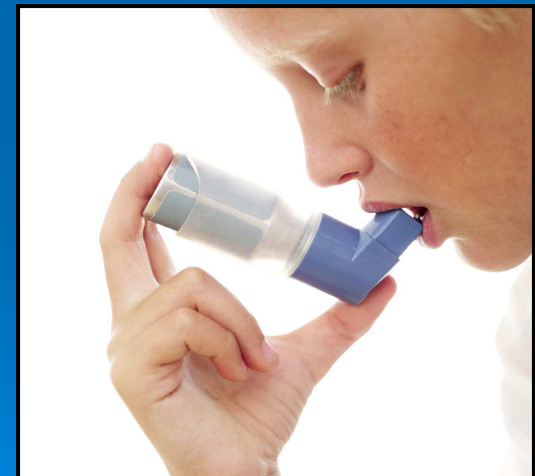


Jerrett et al. 2008. Traffic-Related Air Pollution and Asthma Onset in Children: A Prospective Cohort Study with Individual Exposure Measurement. *Environ Health Perspect* 116:1433-1438. Funded by CARB, NIEHS, US EPA and the Hastings Foundation.

Asthma Onset and Traffic Pollution

Results

- Asthma onset was positively associated with traffic pollution
- About 30% higher risk of asthma onset was seen in communities with higher NO₂ exposure
- Study limitations
 - Limited monitoring data at homes
 - Relatively small sample size
 - Asthma cases by questionnaire



Asthma Onset and Prevalence

Other Children's Health Study Results

- Asthma onset found in children highly exposed to ozone (1)
- Increased prevalence (children already diagnosed with asthma) in children exposed to traffic-related pollution (2,3)

1. McConnell R et al. 2002, Asthma in exercising children exposed to ozone: a cohort study. *Lancet* 359:386-91

2. Gauderman WJ et al. 2005. Childhood asthma and exposure to traffic and nitrogen dioxide. *Epidemiology*, 16:737-743

3. McConnell R. et al. 2006. Traffic, susceptibility and childhood asthma. *Environ Health Perspect* 114:766-772

Conclusion

- Traffic-related pollutants (NO₂ and ozone) linked to onset of asthma
- Reducing traffic exposure in children is expected to reduce asthma symptoms and asthma prevalence

