NYU STUDY TO INVESTIGATE TRAFFIC RELATED AIR POLLUTION: EXPOSURES AND EFFECTS AMONG CHILDREN WITH ASTHMA IN THE SOUTH BRONX, NY

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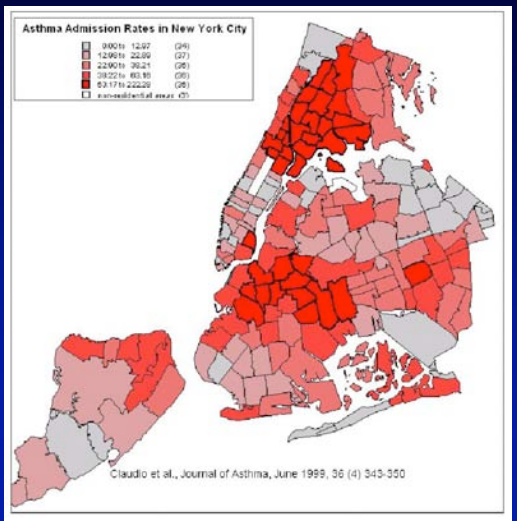
Asthma Hospital Admission Rates Are Especially High in NYC



In the Bronx, the rate of asthma hospitalizations increased 110 to 120 percent between 1987 and 1996, as compared to 35 to 50 percent increases in most other neighborhoods in NYC

Documented Effects of Ambient Air Pollution

- Reduced lung capacity in children and adults
- Lung airway irritation and inflammation
- Asthma attacks
- Increased hospital ER visits and admissions
- Increased mortality

Diesel Particles Have Been Identified as Among Those Especially Injurious

- Diesel Particles are in the fine fraction (sub-micron) siz range that can get into the deepest part of the lung.
- Diesel exhaust contain irritants and cancer-causing substances (e.g., BaP, benzene).
- European and U.S. studies show higher rates of asthm problems near vehicle traffic (e.g., Brunekreef et al., 19 de Hartog et al., 1997; English et al., 1999) .
- Experimental studies indicate that exposure to diesel particles increases asthma reactions (e.g., IgE immuno-globulin antibody production: Diaz-Sanchez et al., 199

Study Design

- Group of ten elementary-school children with asthma from each of four South Bronx elementary schools were followed for a month at each school.
- The subjects' personal respiratory symptoms, lung function, activity pattern data, and personal air pollution exposures were collected at the same time.

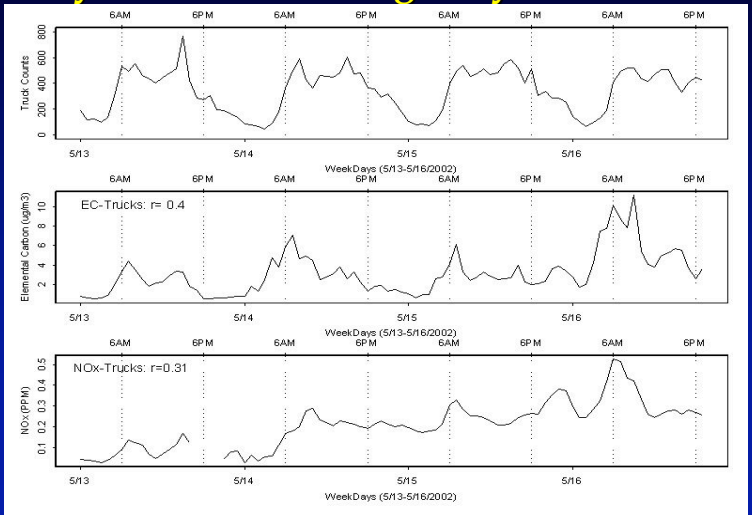
Study Conducted at 4 Bronx Schools

- **PS 154 (Spring, 2002)**
  - 33 East 135 Street
  - Next to the Major Deegan Highway
- **MS 302 (Spring, 2004)**
  - 681 Kelly Street
  - Four Blocks West of the Bruckner Expressway
- **CS 152 (Fall, 2004)**
  - 1007 Evergreen Avenue
  - Next to the Bruckner Expressway
- **MS 201 (Spring, 2005)**
  - 730 Bryant Avenue
  - Hunts Point, 6 Blocks East of the Bruckner

Traffic Impact Highest at Schools Beside the Bronx's Highways (30-50% higher)

EPA Van Provided Continuous Central Site Data at Each School

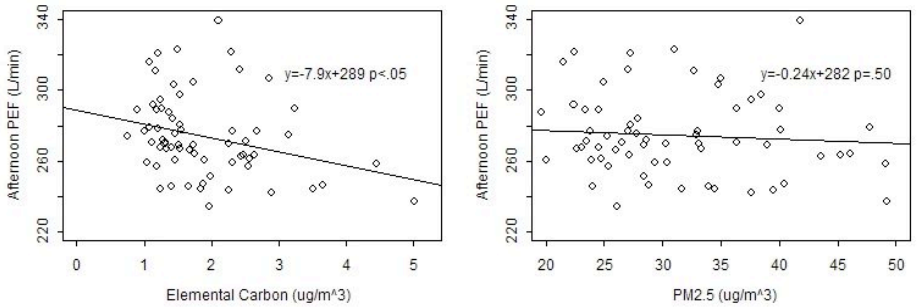
Elemental Carbon (Soot) Pollution Was Related to Hourly Variations in Highway Truck Traffic



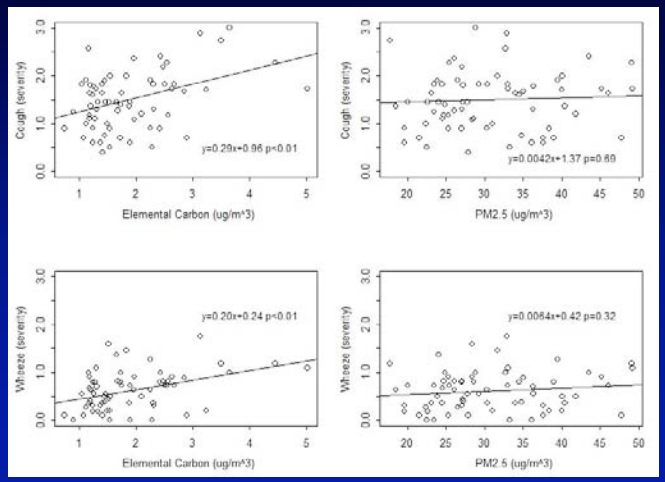
Students Used Wheeled Backpack for Personal Air Sampling

Symptoms, Lung Function, and Activity Data Collected Daily from the Students

Lung Function "Peak Flow" Decreases were More Associated with Traffic Particles than $PM_{2.5}$ in General



Asthma Symptom Severity Index Nearly Doubled on High Traffic Pollution (EC) Days



Symptom severity index was determined by adding morning and afternoon symptom ratings (0-5) and averaging daily across childre

Conclusions

- **Diesel traffic pollution is a significant contributor to asthma problems** among children in the South Bronx.
- Peak outdoor elemental carbon (EC) soot concentrations at the NYU van were correlated with peak truck traffic periods.
- Daily asthma symptoms and lung function analyses results indicate that diesel traffic soot particles are more injurious to children's lung function and asthma symptoms than other $PM_{2.5}$ particles.

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