Air Pollution and Childhood Respiratory Allergies in the United States

March 26, 2009

California Environmental Protection Agency
AIR RESOURCES BOARD
Background

- Respiratory allergies
  - Common chronic condition in children
  - Contribute to school absences
- Environmental factors may worsen symptoms
- Association between air pollution and childhood allergies studied in Europe and Asia
- Today’s health update – 1st large nationwide study*

Methods

- 72,279 children, ages 3-17
  - 7.6% from Southern California
- Air pollutant data
  - Annual averages for PM2.5, PM10, NO2, SO2
  - Ozone summer averages
- Controlled for race/ethnicity, age, sex, and other factors
Results

- 19.2% had hay fever and/or respiratory allergy
- Ozone: for every 10 ppb increase, likelihood of allergy exacerbation increased by 20%
- PM2.5: for every 10 µg/m³ increase, likelihood of allergy exacerbation increased by 16%
- Greater ozone effect in children from higher income families
  - Reason for effect is unclear
Results (cont.)

- No associations with NO$_2$, SO$_2$

- Study limitations
  - Annual or summer average pollutant concentrations
  - Parental recall survey
  - Incomplete record of smoking exposures
Results Consistent with Some Prior Studies

- Previous U.S. study showed trend of increased hay fever rates with higher ozone concentrations\(^1\)
- German study described association between long-term PM2.5 exposure and hay fever and pollen sensitization\(^2\)
- Dutch study found increased pollen sensitization near roadways with high truck traffic\(^3\)


Conclusions

- Ozone and PM2.5 can exacerbate allergic symptoms
- Continued reduction in ozone and PM2.5 exposures are expected to
  - Reduce allergic symptoms in children
  - Reduce school absences