

**THE SOUTHERN CALIFORNIA  
CHILDREN'S HEALTH STUDY:  
Recent Results**

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Air Resources Board



**California Environmental Protection Agency**

Thank you Mr. Kenny.



The Children's Health Study (CHS), principally funded by the California Air Resources Board (ARB) and performed by the University of Southern California, has been studying the effects of children's chronic air pollution exposures in twelve Southern California communities with different levels and patterns of air pollution since 1991. Results published in 2001 show that children in the communities with the highest levels of air pollution, as compared to those in the communities with the lowest levels, had lower rates of lung function growth. This observation was found especially in children exposed to the highest levels of PM, Oxides of Nitrogen, and atmospheric acidity. Ozone did not appear to impact lung growth rates.

## PURPOSE

- To determine the effect of air pollution on the lung function growth of children exposed to more recent levels of air pollution



The study investigators have published an analysis in July 2002 on a second cohort of children, which replicates the results found in the first study. The recent data are from 1,700 fourth-graders enrolled in 1996.

## RESULTS

- Acid vapor, NO<sub>2</sub>, PM2.5 exposure is associated with decrease in lung function growth rate
- Ozone is associated with decrease growth in peak flow rate
- Elemental carbon is associated with decrease in lung function growth rate



The CHS measured the children's lung function annually, monitored the communities' air pollution for four years, and analyzed the relationships between their lung function growth and the levels of six pollutants. This analysis found that higher exposures to acid vapor, ozone, nitrogen dioxide, PM2.5, and elemental carbon in PM2.5 significantly decreased measures of lung growth and functioning.

## IMPLICATIONS



- Confirms previous findings on reduced lung function growth
- Ozone can cause chronic effects
- Diesel exhaust may cause respiratory effects
- Effects seen at more recent lower pollution levels



Confirmation of slower growth in a second group significantly strengthens the evidence supporting the adverse lung growth effects of higher pollution exposures and shows that these adverse effects are still occurring at more recent lower pollution levels. In contrast to the previous study, children in this analysis with higher ozone exposures had reduced growth of peak flow rates. The slower lung growth associated with higher exposures to elemental carbon may indicate a specific respiratory effect of diesel exhaust; diesel engines are a major source of elemental carbon in very small particles in Southern California.

Slower lung growth over a period of several years, now confirmed in two different groups of children, is the strongest evidence of a chronic effect of air pollution on children's respiratory health. Lung function reaches a maximum in young adults; children whose lungs have grown more slowly may have lower maximum lung function, a question of intense interest to respiratory researchers. Adults with lower maximum function may be more susceptible to respiratory diseases and chronic problems as they age.

## THE FUTURE OF CHS



- ARB support of health assessment ends 2003
- ARB continues to support monitoring network
- NIH grant for 5 more years



While ARB's involvement with the health assessment of the Children's Health Study ends in 2003, we will continue to support the monitoring network. The investigators, through a \$20 million dollar grant by NIH, will be following the children into young adulthood to obtain valuable data on maximum lung function. This investigation is in progress, and promises to provide critical insights into air pollutants impacting the respiratory health of our children.