# The Children's Health Study

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**New!** Latest Findings: **Air Pollution Harms Children's Lungs for Life**

**USC Press Release** - "Smog May Cause Lifelong Lung Deficits"

**New England Journal of Medicine** - "The Effect of Air Pollution on Lung Development from 10 to 18 Years of Age"

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The Children's Health Study, which began in 1992, is a large, long-term, study of the effects of chronic air pollution exposures on the health of children living in Southern California. Children may be more strongly affected by air pollution because their lungs and their bodies are still developing. Children are also exposed to more air pollution than adults since they breathe faster and spend more time outdoors in strenuous activities.

About 5500 children in twelve communities were enrolled in the study; two-thirds of them were enrolled as fourth-graders. Data on the children's health, their exposures to air pollution, and many factors that affected their responses to air pollution were gathered annually until they graduated from high school.

The Children's Health Study Final Report is available and represents an extensive compilation of more than 10 years of community ambient air pollution measures and health outcomes related to lung function growth, asthma, bronchitis, and acute respiratory illnesses. Although the ARB funding support for the health portion of the study has concluded, the investigators have received a grant from the National Institute of Environmental Health Sciences to continue the program for an additional three years. The ARB will continue to work in collaboration with the CHS investigators through assistance with the monitoring network as they continue with this invaluable work.

## Importance of the Children's Health Study

The information provided by the study will help the Air Resources Board (ARB) protect public health. The ARB sets California's ambient air quality standards to protect people who are the most sensitive to air pollution.

## The Communities and Pollutants Studied

The twelve communities in the study were chosen because they have different patterns of high and low levels of these four pollutants:

- Ozone
- Nitrogen Dioxide
- Acid Vapor
- Particulate Matter That is Breathed Deep into the Lungs (PM10, PM2.5)


(Please click on the image to see a larger map.)

## The Information Gathered by the Study

Concentrations of the four pollutants were continuously measured in each community throughout the study and for brief periods in schools and some homes. In addition, each child's lung function was tested every spring. Annual questionnaires asked about the children's respiratory symptoms and diseases, such as chronic cough and asthma; level of physical activity; time spent outdoors; and many other factors known to influence children's responses to air pollution, such as parental smoking and mold and pets in the household.

## Major Results of the Study

- **Air Pollution Harms Children's Lungs for Life** - Children exposed to higher levels of particulate matter, nitrogen dioxide, acid vapor and elemental carbon, had significantly lower lung function at age 18, an age when the lungs are nearly mature and lung function deficits are unlikely to be reversed. [USC]

  N Engl J Med 2004; 351:1057 - 1067 (Link to the article - May require registration)
- Children that were exposed to current levels of air pollution had significantly reduced lung growth and development when exposed to higher levels of acid vapor, ozone, nitrogen dioxide and particulate matter which is made up of very small particles that can be breathed deeply into the lungs. Summary of the Article.

  Am J Respir Crit Care Med 2002; 166:76 - 84 (Link to the article - May require registration)
- Children living in high ozone communities who actively participated in several sports were more likely to develop asthma than children in these communities not participating in sports. Press Release January 31, 2002.

  Lancet 2002; 359:386 - 391 (Link to the article - May require registration)

- Children living in communities with higher concentrations of nitrogen dioxide, particulate matter and acid vapor had lungs that both developed and grew more slowly and were less able to move air through them. This decreased lung development may have permanent adverse effects in adulthood.

  Am J Respir Crit Care Med 2000; 162:1383 - 1390 (Link to the article - May require registration)

- Children who moved away from study communities had increased lung development if the new communities had lower particulate matter levels, and had decreased lung development if the new communities had higher particulate matter levels.

  J Respir Crit Care Med 2001; 164:2067 - 2072 (Link to the article - May require registration)

- Days with higher ozone levels resulted in significantly higher school absences due to respiratory illness. Children with asthma who were exposed to higher concentrations of particulate matter were much more likely to develop bronchitis.

  Epidemiology 2001; 12:43 - 54 (Link to the article - May require registration)

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**ARB Press Release** - "ARB's Ten-Year Children's Health Study is Completed"

**An Overview** of the Children's Health Study is available here.

**The Fact Sheet** for the Children's Health Study is available here.

**The Children's Health Study Video** which is an overview of the study's goals, methods and results is available at the following links in both Spanish and English versions. There is an order form for a **FREE** copy of the video in either DVD or VHS tape format at the previous links.

**To View Graphs of Data from the October 2003 Fires** in the Los Angeles area, please follow this link to the "Children's Health Study Fire Data".

Additional Children's Health relatated reports: Research Projects database results.

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## For More Information

For more information about this ARB Program, please contact Dr. Barbara Weller at 916-324-4816.

http://www.arb.ca.gov/research/chs/chs.htm#new