

# **The Benefit of Avoiding School Absences Through Reduced Ozone**

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**October 23, 2003**

**Air Resources Board**



**California Environmental Protection Agency**

Thank you, Ms. Witherspoon. Good morning, Dr. Lloyd and members of the Board.

This morning's presentation focuses on results that provide evidence for the health benefits of air pollution control in terms of avoiding school absences among children.

## **Ozone and School Absences\***

- **Ozone can damage respiratory tract, causing inflammation and irritation, resulting in respiratory symptoms**
- **Short-term change in ozone associated with school absences**
  - **2,100 4th graders in 12 communities**



\*Gilliland, Frank D. et al. "The Effects of Ambient Air Pollution on School Absenteeism Due to Respiratory Illnesses", *Epidemiology*, January 2001, Vol 12, No. 1

Exposure to ground-level ozone can damage the respiratory tract, which can cause inflammation and irritation. Such effects can lead to coughing, chest tightness, shortness of breath, and the worsening of asthma. This has raised the concern that ozone exposure may be related to school absences.

Dr. Gilliland and colleagues at the University of Southern California investigated the relationship between ozone, nitrogen dioxide, and particulate matter less than 10 microns in diameter and school absenteeism in a group of about 2,100 4th graders. These students were from the Children's Health Study, which enrolled children from 12 Southern California communities.

The investigators found that short-term changes in ozone, but not nitrogen dioxide or PM10, were associated with a substantial change in school absences resulting from both upper and lower respiratory illness. They found that an increase of 0.02 parts per million of ozone was associated with an increase of 63% for illness-related absence rates. On any given day, about 3% of students are absent.

## **Benefit of Ozone Reduction on School Absences in South Coast Air Basin\***

- **3.2 million school absences avoided in 1999 due to ozone reduction from 1990 levels**
  - **Economic benefit: \$250 million**
- **Annually, another 900,000 absences would be avoided if the State ozone standard were attained**



\*Hall, Jane V. et al. "Economic Valuation of Ozone-Related School Absences in The South Coast Air Basin", February 2003  
Final Report to ARB Contract No. 00-334

Dr. Jane Hall from California State University at Fullerton applied results from Gilliland and estimated the impact of ozone exposure on school absences in the South Coast Air Basin. As we all know, ozone levels have drastically decreased from 1990 to 1999. In a report to ARB, Dr. Hall and colleagues found that 3.2 million absences were avoided in 1999 in the South Coast due to the reduction in ozone levels from 1990 to 1999. This is equivalent to avoiding 1 absence per year for each school-aged child in the South Coast Air Basin.

Further, Dr. Hall estimated that the overall economic value of these avoided absences is \$250 million. That equates to about \$75 per student. For this calculation, it was assumed that a parent or guardian would stay home to take care of the sick child, resulting in loss of productivity.

Moreover, if the 1999 ozone levels were reduced to attain the State standard, about 900,000 additional absences per year would be avoided in the South Coast. On average, about 25 million absences occur annually in the South Coast.

## Implications

- **Elevated levels of ambient ozone can increase school absenteeism in children**
- **Reduction in ozone levels can lead to:**
  - **reduced school absences**
  - **greater productivity for parents**
  - **higher quality of education**
  - **potentially greater productivity for children**



To summarize, exposure to elevated levels of ambient ozone can result in increased school absenteeism in children. If we can reduce the current levels of ozone to meet the State standard, Dr. Hall estimates that as many as 900,000 absences can be avoided in the South Coast on an annual basis -- resulting in greater productivity among parents. Moreover, fewer absences would lead to a higher quality of education and potentially greater productivity later in the child's life.

This finding clearly illustrates the continued need to reduce ozone not only in the South Coast but also throughout the State. Further, it reinforces the benefit of conducting ozone health advisories, which are provided to schools so that they can restrict children's outdoor activities and thus limit their exposure to ozone.

This concludes my presentation. I will be happy to answer any of your questions. Thank you for your attention.