

# Health Update

## Mortality and Indicators of Traffic-related Air Pollution in the Netherlands

March 27, 2003



**Air Resources Board**  
**California Environmental Protection Agency**

**Good morning Chairman Lloyd and members of the Board.**

Investigators have previously reported associations between long term exposure to particulate air pollution and mortality. The Air Resources Board has recently adopted new annual PM 10 and PM 2.5 standards and continues to review the latest information to protect the most sensitive members of the public from chronic and acute health effects related to particulate air pollution.

The presentation this morning is a discussion of a study evaluating the association between long-term exposure to traffic-related pollutants and cardiopulmonary mortality in a cohort of individuals age 55-69.

## Background

---

- Long-term exposure to PM associated with mortality from respiratory and cardiovascular disease, and lung cancer
- Exposure to traffic-related pollutants varies on a smaller scale
- Traffic intensity and distance to major roadways important
- Distance from roadways associated with chronic respiratory disease in children



Results of three previous studies, presented in an earlier health update, have suggested that long-term exposure to particulate matter air pollution is associated with increased mortality from respiratory and cardiovascular disease and from lung cancer.

For estimating exposure to air pollutants in these studies, investigators compared several large, usually metropolitan, regions with different ambient air pollution concentrations, with the assumption that exposure is uniform within each region. This assumption, however, may not accurately reflect exposure especially for pollutants with important local sources.

Investigators in Europe reported that concentrations of nitrogen dioxide, an important traffic-related pollutant, for example, varied between small regions within cities. They indicated that traffic intensity and distance to major roadways are important in assessing long-term exposure to this pollutant. Investigators have further reported that chronic respiratory disease in children is associated with living near major roadways.

## **“Association between mortality and indicators of traffic related air pollution in the Netherlands: a cohort study” \***

**G. Hoek and colleagues**

---

- **4,500 randomly chosen residents**
- **Cardiopulmonary mortality assessed**
- **Exposure to traffic pollutants measured**
- **Living near major roadway determined**



**\* Lancet (2002) volume 360, pages 1203-1209**

The focus of today’s health update is a study recently published by Hoek and colleagues in the medical journal Lancet. In the article, they reported an association between mortality and indicators of traffic-related air pollution in the Netherlands.

The subjects for this study consist of 4,500 residents randomly selected as a subset from the Netherlands Cohort study on Diet and Cancer, which is an ongoing study started in 1986 on over 120,000 residents.

The investigators specifically evaluated cardiopulmonary mortality and its association with traffic-related air pollution.

The pollutants of interest in this study were black smoke and nitrogen dioxide. These pollutants were used as indicators of exposure to traffic pollutants. The investigators determined background levels for the entire region and for the urban environment.

Further, the investigators used living near major roadways as a index for exposure to the local traffic-generated pollutants. This was defined as living within 100 meters of a freeway or within 50 meters of a major street in their evaluation.

## Results

---

- **185 deaths from cardiopulmonary causes (1986 - 1994, 4% of cohort)**
- **Cardiopulmonary mortality associated with living near major roads**
  - corresponds to ~ 20 deaths
  - additional risk for those living near major roads greater than 10 years



Over the course of this study, there were 185 cardiopulmonary deaths. After adjusting for confounding factors such as smoking and background exposure to black smoke and nitrogen dioxide, those living near a major roadway or freeway had higher relative risks for cardiopulmonary mortality.

This corresponded to approximately 20 cardiopulmonary deaths for individuals living near major roadways in this study.

Interestingly, when the population was limited to those who lived in the same location for 10 years or more, the risk for cardiopulmonary mortality increased for those living near a major roadway. This implies that longer periods of exposure to traffic-related pollutants may increase the risk to cardiopulmonary deaths .

## Conclusions and Implications

---

- **A consistent association observed between cardiopulmonary mortality and living near a major road**
- **Studies of traffic-related pollutant exposure - consider fine-scale levels**
- **Results have relevance to public health in California**



This study agrees with findings from three previous cohort studies conducted in the United States demonstrating an association between exposure to air pollution and cardiopulmonary mortality. The consistency of the association across different countries gives credence to the idea that air pollution is associated with mortality in both the United States and Europe.

The results from this study indicate that there is a consistent association between cardiopulmonary mortality and living near a major roadway and further indicates the importance of assessing exposure at a finer scale, especially with regards to local source pollution such as vehicular traffic.

The finding of increased risk for those living near roadways is important to the State of California where many of our citizens live in close proximity to major roads and freeways. Motorized traffic emissions result in small-scale spatial variations with high concentrations at short distances from major roads. This exposure could result in adverse health effects.

Although black smoke and nitrogen dioxide were used as indicators for traffic-related air pollution, these components may not directly be responsible for the observed mortality. It is possible that some other traffic-related pollutant such as ultrafine particles or diesel particulate matter, for example, is responsible for the health effect observed in this study.

This concludes the health update and we would be happy to answer any questions.

Thank you very much.