

Freeways' tainted air harms children's lungs, experts say

Lifelong damage is found in 13-year study of 3,600 Southland youngsters living within 500 yards of a highway.

By Thomas H. Maugh II, Times Staff Writer
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Traffic in the background

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In the largest and longest study of its kind, USC researchers have found that children living near busy highways have significant impairments in the development of their lungs that can lead to respiratory problems for the rest of their lives.

The 13-year study of more than 3,600 children in 12 Central and Southern California communities found that the damage from living within 500 yards of a freeway is about the same as that from living in communities with the highest pollution levels, the team reported Thursday in the online version of the medical journal *Lancet*.

"If you live in a high-pollution area and live near a busy road, you get a doubling" of the damage, said lead author W. James Gauderman, an epidemiologist at the Keck School of Medicine of USC.

"Someone suffering a pollution-related deficit in lung function as a child will probably have less than healthy lungs all of his or her life," he said.

The greatest damage appears to be in the small airways of the lung and is normally associated with the fine particulate matter emitted by automobiles.

"This tells me that I wouldn't want to be raising my children near a significant source of fine-particle air pollution," said economist C. Arden Pope III of Brigham Young University, an expert on air pollution and health who was not involved in the study. "I, myself, would want to be living in areas where the exposure is lower."

The research is part of an ongoing study of the effects of air pollution on children's respiratory health. Previous findings have detailed how smog can stunt lung growth and how living close to freeways can increase the risk of children being diagnosed with asthma.

This latest study of freeway proximity and lung capacity was funded by the California Air Resources Board; the National Institute of Environmental Health Sciences; the Environmental Protection Agency; the National Heart, Lung and Blood Institute; and the Hastings Foundation.

Gauderman and his colleagues recruited groups of fourth-grade students, average age 10, in 1993 and 1996. Their schools were scattered from Atascadero in San Luis Obispo County to Alpine in San Diego County.

The team collected extensive information about each child's home, socioeconomic status and other facts that might impinge on health.

Once each year, the team visited the schools and measured the children's lungs, assessing how much air could be expelled in one breath and how quickly it could be expelled.

These cohorts of children "are truly an important resource because the study has been going on so long," said epidemiologist Jonathan Samet of Johns Hopkins University's Bloomberg School of Public Health, who also did not take part in the study. The size and scope of the study make it very difficult to replicate, he said.

Results from the study reported in 2004 indicated that children in the communities with the highest average levels of pollution suffered the greatest long-term impairment of lung function.

In the new study, Gauderman and his colleagues found that by their 18th birthday, children who lived within 500 yards of a freeway had a 3% deficit in the amount of air they could exhale and a 7% deficit in the rate at which it could be exhaled compared with children who lived at least 1,500 yards, or nearly a mile, from a freeway. The effect was independent of the overall pollution in their community.

Gauderman had no estimate for the percentage of people in Southern California living within 500 yards of a freeway, but he noted that in a typical city such as Long Beach, it is about 17%.

The most severe impairment was observed in children living near freeways in the communities with the highest average pollution — Upland, Mira Loma, Riverside and Long Beach. Those children had an average 9% deficit in the amount of air they could expel from the lungs.

"Even if you are in a relatively low regional pollution area, living near a road produces [lung problems]," Gauderman said.

About one-third of the children moved during the course of the study but stayed in the same community. Lung impairment was smaller among those who moved farther from the freeways.

The finding is important "because it shows that within communities, some children are at higher risk than others," Dr. Thomas Sandstrom and Dr. Bert Brunekreef wrote in an editorial accompanying the paper. "Thus, environmental equity is an issue of local rather than regional dimensions."

The results were also independent of the children's initial health and whether they were smokers. "This suggests that all children, not just susceptible subgroups, are potentially affected by traffic exposure," Gauderman said.

Although the deficit in lung growth seems small, it could have long-term effects, Samet said.

"The concern is that the exposure leaves young adults with smaller lungs than they might have had otherwise," he said. That could leave them more vulnerable to lung diseases and more susceptible to the effects of pneumonia and other infections.

All the researchers conceded that there is little that can be done to mitigate the effects of the traffic pollution now.

But when local governments are planning new schools and new housing developments, Gauderman said, "this should be taken into account."

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