Date: 5-12-09

Submitted in PLUM Committee

Council File No: ~~08-202~~ 09-0082

Item No.: ~~#~~ 11

Deputy: B-GREAVES

ENV-2005-9337-MND-REC

CF-09-0082

(2400 Allesandro)

09-0082

April 20th, 2009

Planning & Land Use Management Committee
c/o City Clerk Barbara Greaves, Legislative Assistant, PLUM
Room 395 City Hall
200 N. Spring St.
Los Angeles, Ca. 90012

Re: ENV-2005-9337-MND-REC & CF-09-0082

Mr. Reyes:

As I stated before this committee on February 3rd, 2009, I have flourished on the Semi-Tropic Spiritualists' Tract for twenty-one years. My one-bedroom, one-bath dwelling is Home and this is where I will live for the remainder of my life.

In his book "Material Dreams; Southern California Through The 1920s", author Kevin Starr was correct when he described the Semi-Tropic Spiritualists' Tract '(perhaps the most exotic subdivsion of them all!)'.

But life on the "Hill" hasn't been without its challenges.

In the spring of 2002 my husband, Carson Leistikow, was diagnosed with congestive heart disease. Six months later it was determined that he was also diabetic.

I served as his caretaker until I became ill with breast cancer.

I was prepared for the unpleasantries of chemotherapy: nausea, hair loss, fatigue, a weak immune system. But after five years of being cancer-free I am still confronted with a very delicate immune system.

Without knowing the full extent of grading pertaining to the 2400 Allesandro project and what health risks may be involved, who will claim responsibility for the elderly and the very young of the Semi-Tropic Spiritualists' Tract? Who will be held accountable for those with existing health issues? Who?

Cindy Ortiz
1940 Walcott Way
Los Angeles, Ca. 90039
323.664.2412

09-0082

April 20, 2009

Councilman Ed Reyes, Chair
Planning & Land Use Management Committee
c/o City Clerk Barbara Greaves, Legislative Assistant, PLUM
200 N. Spring St. Room 395
Los Angeles, Ca. 90012

Mr. Reyes,

I live by the Semi-Tropic Spiritualists' Tract at on Walcott Way. I am very concerned about the residential project at 2400 Allesandro. City Planning ENV-2005-9337-MND-REC & CF-09-0082.

I am concerned because I struggle to live with congestive heart failure. Breathing can be difficult. Everyday I have to consider the quality of air around me.

Because of the size of this development there will be serious environment impact. There will be dust and dirt pushed into the air from the grading, construction and traffic. This project is not a house being built next door. It is many houses. It is not a regular conforming lot. It is steep uneven fill. This project has grown from a few of simple residential houses to a huge, huge development.

Living next to a huge construction project is a serious concern for me. The result will not be good for me. Not good at all.

Sincerely,

Carson Leistikow
1940 Walcott Way
Los Angeles, Ca. 90039

April 20th, 2009

09-0082

Planning & Land Use Management Committee
c/o City Clerk Barbara Greaves, Legislative Assistant, PLUM
Room 395 City Hall
200 N. Spring St.
Los Angeles, Ca. 90012

Re: ENV-2005-9337-MND-REC & CF-09-0082
2400 Allesandro

Mr. Reyes:

My name is Louis H. McLean and I have lived on the Semi-Tropic Spiritualists' Tract since 1952.

I suffer from congestive heart disease and COPD (chronic obstructive pulmonary disease).

I am very concerned about possible health risks this project may present.

Sincerely,

Louis H. McLean

Louis H. McLean WWII Combat Vet
1939 Modjeska
Los Angeles, Ca. 90039

OFFICE OF CONTROLLER

LAURA N. CHICK
CONTROLLER

200 N. MAIN STREET
ROOM 300
LOS ANGELES 90012
(213) 978-7200

March 23, 2009

The Honorable Antonio Villaraigosa
The Honorable Rockard J. Delgadillo
The Honorable Members of the City Council

Ever since the mid 1990s when I was a City Councilmember, I wondered what actually happened with the conditions we imposed when approving development projects. The City often sets requirements to shape and improve a project, promote safety and mitigate negative impacts to communities.

Now as Controller, I have circled back to answer the question: "Who ensures that the requirements attached to these developments are followed?" The answer is: "No one." We are actually often relying on voluntary compliance by the developers.

My report found that, in general, there is no single Department in charge of development projects from beginning to end. The Planning Department is indeed the lead agency in imposing conditions. However other Departments, such as Building and Safety, can add or change conditions without including the Planning Department.

The Planning Department's new data management system was intended to be a central database that tracked conditions for approval. However, this is not the cure-all it was intended. Instead we have ended up with three stand-alone systems that are neither integrated not coordinated. Further, a new computer system alone won't solve the problems in the current development process, unless accompanied by key changes in our business processes.

It is clear some significant changes must be made here. If projects are approved with conditions attached, is it not in the City's best interest to ensure those conditions are met? Certainly that is what the public expects.

Sincerely,

Laura N. Chick

LAURA N. CHICK
City Controller

voice of san diego

an independent nonprofit | May 12, 2009

Plans to Build Homes Near Freeway Cause Concerns

By ROB DAVIS Voice Staff Writer

Tuesday, Feb. 20, 2007 | Each year, about 730,000 diesel-exhaust spewing trucks cross north into San Diego at the Otay Mesa border crossing. Once they've cleared customs, they throttle out Otay Mesa Road, a nondescript stretch of asphalt that takes them past open fields -- undeveloped tracts of land whose fate the city is currently deciding.

If a group of developers gets its way, those vacant lots would become San Diego's newest neighborhoods. The developers hope to build thousands of homes directly adjacent to a proposed interstate extension that would carry some of the region's dirtiest truck traffic.

Seven developers -- the Corky McMillin Cos., D.R. Horton, Pardee Homes, Centex Homes, Sunroad Enterprises, Integral Partners and Murphy Development -- are pushing to rezone eastern portions of Otay Mesa to make way for up to 9,500 new homes on what is currently designated for industrial and commercial uses.

The homebuilders are funding the studies that accompany the border area's future development plan. In exchange, their preferred plan has been guaranteed an audience with the City Council, which will consider several blueprints for Otay Mesa in November. The developers' preferred plan calls for new housing along the interstate extension; other alternatives do not.

If those homes are built, research shows that their residents will be at risk for a host of respiratory illnesses and other ailments. A robust body of scientific evidence shows that living near freeways threatens residents' health, increasing short-term mortality while reducing children's lung development. A landmark study released last month shows those effects extend further beyond freeways than once thought. Not heeding that science, several health experts said, would disregard the public's well-being.

"It would be irresponsible, given what we know now, to put a major artery through a planned residential community," said Dr. Ira Tager, a professor of epidemiology at the University of California, Berkeley, School of Public Health. "A strong case could be made that this is not the way you should build something like this."

Historically, when planners have considered building homes near interstates, their primary concern has been noise generated by cars and trucks swishing past. This explains noise-reducing buffers such as sound walls and

Related Links

construction of new schools within 500 feet of freeways. But that rule does not extend to homes or daycare providers, and USC's Gauderman said the rule has no teeth. While it prohibits schools from being built near freeways, it doesn't prevent freeways from being built near schools.

With California taking some steps toward ensuring schoolchildren's health, "it seems surprising that that care and planning isn't translating over into residential settings where people are more likely to be," said John Spengler, a Harvard University professor of environmental health and human habitation. "This is the time to make a difference in how we plan our infrastructure."

Emissions from diesel combustion in trucks and buses pose the largest cancer risk in the air around us. The particles are extraordinarily small. The lungs inhale them deeply. What's worse: Carcinogenic chemicals such as benzene often attach themselves to the particles, lodging themselves deep in the lungs, where they can wreak havoc on lung function.

The homes in the Otay Mesa plan would be built along a uniquely problematic truck traffic corridor. The Otay Mesa border crossing is the region's major thoroughfare for cargo trucks driving north from Mexico. Those trucks -- manufactured and driven in the United States and then handed down -- typically produce dirtier emissions than trucks here, because they're older and have degraded emission-control systems, said Rob Reider, a spokesman for the San Diego County Air Pollution Control District, the local air regulator.

The state is working to address long-term diesel pollution. The California Air Resources Board is developing regulations that would mandate emission controls on those border-crossing trucks. Since October, the state has required all diesel fuel sold to be ultra-low-sulfur, a cleaner burning variety.

USC's Gauderman said those regulations are a step in the right direction, but noted that diesel trucks are not the sole source of roadway pollution and the "freeway effect." Further study is needed, he said, to pinpoint the most problematic pollutants.

Staff writer Evan McLaughlin contributed to this story.

Please contact Rob Davis directly with your thoughts, ideas, personal stories or tips. Or send a letter to the editor.

In Otay Mesa, Builders Push Hard to Convert Land (Feb. 20, 2007)

USC's Lung Development Study (pdf)

landscaping. But a growing body of scientific research shows that residents' lungs -- not their ears -- should govern decision-making.

A study published Jan. 26 in the British medical journal Lancet says that pollution generated on highways can stunt children's lung development from as far away as 1,600 feet, farther than once believed. The University of Southern California researchers behind the study call it "the freeway effect."

Living within 1,600 feet of a freeway -- one-third of a mile -- was found to adversely affect children's lung development, increasing their risks of serious respiratory illnesses and cardiovascular disease later in life. Researchers monitored 3,600 Southern California children from age 10 until they turned 18 years old, using tests that measure how fast and how much the lungs exhale. By the end of the 13-year study, researchers found children living within 1,600 feet of freeways exhaled 3 percent less air with 7 percent less force than those living a mile away.

Some discrepancy still exists about where the highest exposures occur, said lead author James Gauderman, a professor of preventative medicine at USC's Keck School of Medicine. His study showed trends within 3,200 feet of freeways, though the most statistically significant occurred within 1,600 feet.

"This and other studies point to the need to consider health when we plan schools and homes," Gauderman said.

Developers' plans for Otay Mesa appear to ignore that recommendation. Two proposed neighborhoods straddle a proposed extension of Interstate 905. Another entire development would fall almost completely within about 1,500 feet of the road -- close enough to bear the full brunt of the "freeway effect."

City planning officials say they're aware of the science as well as California Air Resources Board guidelines that recommend against building homes within 500 feet of freeways. They say they will incorporate those studies and guidelines in their plans, potentially requiring businesses -- not homes -- to be built along the freeway.

"We're looking at those as we develop our urban design guidelines for the urban plan update," said Mary Wright, a city planning program manager.

Some question whether city officials are sincere and say they would rather see formal policies, not informal promises.

"How is that actually going to get implemented? That hasn't come out in the process," said Laura Benson, a policy advocate at the National City-based Environmental Health Coalition. "When you have a totally new community -- vacant land -- why would you start getting into that mess if you don't have to?"

The consortium of homebuilders behind the project, known as the Otay Mesa Planning Coalition, said they are prepared to shape their developments to standards that will be outlined in a environmental impact report, which the city and its consultants will prepare during the next year.

David Nielsen, a lobbyist for the coalition, said the California Air Resources Board guidelines, which recommend against building homes 500 feet from freeways, are "much quoted and misquoted" by critics who may try to attack the issue. But he said he doesn't anticipate projects will have to be scrapped because of truck traffic impacts.

The state has begun addressing the "freeway effect" through regulation. State law restricts the

Child & Teen Health

Return to Child and Teen Health

January 26, 2007

Children Living Near Freeways Risk Poor Lung Development

According to a report in the latest online edition of the Lancet, children who grow up near freeways and a large amount of car and truck exhaust not only have higher rates of asthma, but they may also suffer from underdeveloped lungs.

> "Exposure from tailpipe emissions from motor vehicles potentially carries chronic health risks to children's lung development," said lead researcher W. James Gauderman, an assistant professor in the Department of Preventive Medicine at the University of Southern California, Los Angeles. "We found that kids who live closer to freeways had significantly less lung capacity, compared with kids who lived further from freeways."

Living Near Freeways Hurts Kids' Lungs

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THE LANCET

Articles

The Lancet, Volume 369, Issue 9561, Pages 571 - 577, 17 February 2007
doi:10.1016/S0140-6736(07)60037-3 Cite or Link Using DOI

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Effect of exposure to traffic on lung development from 10 to 18 years of age: a cohort study

Dr W James Gauderman PhD [a], Hita Vora MS [a], Prof Rob McConnell MD [a], Kiros Berhane PhD [a], Prof Frank Gilliland M
Prof Duncan Thomas PhD [a], Fred Lurmann MS [b], Edward Avol MS [a], Nino Kunzli MD [c], Michael Jerrett PhD [d], Prof John Pet
MD [a]

Summary

Background
Whether local exposure to major roadways adversely affects lung-function growth during the period of rapid lung development that takes place between 10 and 18 years of age is unknown. This study investigated the association betwee residential exposure to traffic and 8-year lung-function growth.

Methods
In this prospective study, 3677 children (mean age 10 years [SD 0·44]) participated from 12 southern California communiti that represent a wide range in regional air quality. Children were followed up for 8 years, with yearly lung-function measurements recorded. For each child, we identified several indicators of residential exposure to traffic from large roa Regression analysis was used to establish whether 8-year growth in lung function was associated with local traffic exposu and whether local traffic effects were independent of regional air quality.

Findings
Children who lived within 500 m of a freeway (motorway) had substantial deficits in 8-year growth of forced expiratory volume in 1 s (FEV_1, −81 mL, p=0·01 [95% CI −143 to −18]) and maximum midexpiratory flow rate (MMEF, −127 mL/s, p=0·0 [−243 to −11]), compared with children who lived at least 1500 m from a freeway. Joint models showed that both local exposure to freeways and regional air pollution had detrimental, and independent, effects on lung-function growth. Pronounced deficits in attained lung function at age 18 years were recorded for those living within 500 m of a freeway, w mean percent-predicted 97·0% for FEV_1 (p=0·013, relative to >1500 m [95% CI 94·6—99·4]) and 93·4% for MMEF (p=0·006 [95 89·1—97·7]).

Interpretation
Local exposure to traffic on a freeway has adverse effects on children's lung development, which are independent of regi air quality, and which could result in important deficits in attained lung function in later life.

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Living Near Freeways May Harm Kids' Lungs

California Study Shows Children Housed Near Major Highways Have Slower Lung Development

Jan. 26, 2007 | by none Comments 3

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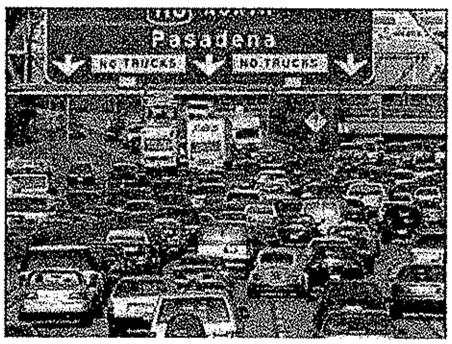

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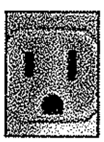

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(WebMD) Children living close to freeways may have slower lung development between ages 10 and 18 than those living farther away.

That's according to a study of more than 3,000 southern California children, published in The Lancet's online edition.

"Since lung development is nearly complete by age 18 years, an individual with a deficit at this time will probably continue to have less than healthy lung function for the remainder of his or her life," write researcher W. James Gauderman, Ph.D., and colleagues.

The study may raise "important questions for society about the structure of the transportation system, engines, fuels, combustion, and road dust in urban areas," editorialists write in The Lancet.

Gauderman works in the University of Southern California's preventive medicine department. He and his team studied 3,677 children in 12 communities in southern California.

The children were in the fourth grade (average age: 10 years) when the study started in the 1990s. They took yearly lung function tests for up to eight years.

Children 10 to 18 go through a period of rapid lung development, the researchers note.
The researchers also looked at how close the children lived to freeways and found that 440 lived less than a third of a mile from one.

Their results showed that the children living that close to a freeway had slower lung development during the study, compared with those living at least three times farther from a freeway.

The findings held after the researchers took other factors into account, including family income, race, asthma, smoking, regional air quality, and kids who moved during the study.

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Local roads that weren't freeways were not associated with slower lung development. The children weren't followed beyond age 18, so it's not clear how well their lungs functioned later in life.

The concentration of pollutants in the area near major freeways may be the problem, but it's hard to rule out other influences, note Gauderman and colleagues.

It's also not clear what factors, if any, influenced the kids' lung development before age 10, say the editorialists. They included Thomas Sandstrom, M.D., Ph.D., of the respiratory medicine and allergy department of University Hospital in Umea, Sweden.

"However, these questions should not distract from the major achievement of follow-up of such a large group of children through secondary school with repeated lung function tests," write the editorialists.

The study was funded in part by the California Air Resources Board, the National Institute of Environmental Health Sciences, and the Environmental Protection Agency.

***SOURCES:** Gauderman, W. The Lancet, Jan. 26, 2007; online edition. Sanstrom, T., The Lancet, Jan. 26, 2007; online edition.*

By Miranda Hitti
Reviewed by Louise Chang, M.D.

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Pretty funny you can't see a mile on a nice day in LA because of all the smog and that's ok, yet it's AGAINST THE LAW to let your customers smoke cigarettes at your bar. California is a nice place to visit but you couldn't pay me to live there, unless of course everyone else left, then it would be pretty nice.

Posted by **bildooreilly** at 6:58 PM : Jan 28, 2007
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Hey California, Maybe you should ban roads within 2 miles of houses. Or houses within 2 miles of roads. Or spanking kids within 2 miles of freeways. BAN SOMETHING! It can't hurt, can it?

Posted by **bhappy2-2** at 4:27 PM : Jan 28, 2007
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If you ever been stuck in trafic behind a diesel you already knew this.

Posted by **Syndicate** at 8:33 PM : Jan 26, 2007
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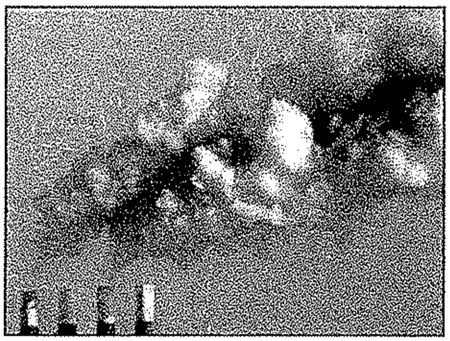
Air Pollution May Lead To Smaller Babies

Study: Exposure Affects Growth Of Fetus

Apr 28, 2009



(AP)

(WebMD) Exposure to air pollution both early and late in pregnancy may have a negative impact on fetal growth, a new study shows.

Air pollution, especially pollution from car exhaust, was linked to smaller birth weight in the newly published study even after researchers controlled for known risk factors.

The study does not prove that exposure to pollutants in the air directly affects fetal growth, and findings from previous investigations examining the question have been mixed.

But the evidence as a whole is increasingly suggestive of such a relationship, lead researcher David Q. Rich, ScD, MPH, of the University of Medicine and Dentistry of New Jersey, tells WebMD.

Air Pollution and Pregnancy

Rich and colleagues examined birth certificates and hospital discharge records for nearly 336,000 babies born full-term in New Jersey between 1999 and 2003. They then matched the birth information to air quality monitoring conducted by the Environmental Protection Agency.

Data from monitoring points within 6 miles of the mothers' homes were used to estimate the level of exposure to specific air pollutants early in the first, second, and third pregnancy trimesters.

Babies born to mothers who were younger, less well educated, lower income, African-American, single parents, or smokers had a higher risk for having a low birth weight for their gestational age.

But even after controlling for these risk factors, increased exposure to air pollutants was associated with an increased risk for delivering a smaller baby.

Heavy exposure to the traffic exhaust pollutant nitrogen dioxide during all three trimesters was linked to an increased risk for restricted fetal growth. The researchers reported that

Life With Twins: Spring Kapchinski's Story

Life With Twins: Maureen Downey's Story

Twins in Demand Through IVF?

risk of a baby being born very small for gestational age rose significantly with each 10 parts per billion increase in nitrogen dioxide exposure.

The study was published this week online and will appear in the Journal of Epidemiology and Community Health.

Larger Studies Needed

It has been suggested that exposure to air pollution during pregnancy might alter cell activity or restrict oxygen and nutrient intake by the fetus.
Maternal smoking is a well-established risk factor for poor birth outcomes, including low birth weight.

March of Dimes deputy medical director Diane Ashton, MD, MPH, tells WebMD that many of the same chemicals found in cigarette smoke are found in air pollution.

"It certainly makes sense that exposure to these chemicals in air pollution can impact pregnancy outcomes," she says. "We definitely need larger studies to help us figure this out."

Recruitment is under way for the largest-ever prospective study in the United States to examine the effect of environmental influences like air pollution on birth outcomes and children's health.

The goal of the National Children's Study is to follow 100,000 children nationwide from conception to young adulthood.

Nancy Wilson, PhD, who studies the impact of exposure to pollutants on children's health, tells WebMD that the large size and rigorous design of the National Children's Study should lead to more definitive answers about the role of environmental exposures in birth outcomes.

Wilson is a research leader with the Battelle Memorial Institute in Durham, N.C.

"There is a lot we still don't know," she says. "It is important that we understand the impact of what we introduce into the environment."

By Salynn Boyles
Reviewed by Louise Chang

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Mr. Obama, it's time to heavily tax smoking again! Please do not let those evil smokers kill our babies! Don't forget global warming will harm babies too. Please tax everyone for causing the destruction of the earth and save us all!

Posted by **budmag06** at 9:52 PM : Apr 28, 2009
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Also notice that the article is not placed where it will attract much attention. Why? Because if it got too much attention, it would raise questions concerning the heavy taxes being placed on smokers, but not on any industry contributing to the air pollution.

Posted by **debinok1** at 8:44 PM : Apr 28, 2009
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""March of Dimes deputy medical director Diane Ashton, MD, MPH, tells WebMD that many of the same chemicals found in cigarette smoke are found in air pollution.""

Finally. It is about time they put the blame where it belongs. Where it has always belonged. And about time they admit what smokers have been saying for years. I have said for years that the pollution in the air is causing more harm to people than second hand smoke ever has or ever will. Now their own studies are proving the same thing.

Posted by **debinok1** at 8:35 PM : Apr 28, 2009
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August 2006

Living Near Heavy Traffic Increases Asthma Severity

Ying-Ying Meng, Rudolph P. Rull, Michelle Wilhelm, Beate Ritz, Paul English, Hongjian Yu, E. Richard Brown, Marlena Kuruvilla, Sheila Nathan

Inquire if hardcopy of this publication is available.

Children and adults who suffer from asthma and live near heavy vehicular traffic are nearly three times more likely to visit the emergency room or be hospitalized for their condition than those wh live near low traffic areas, according to this policy brief from the UCL Center for Health Policy Research. For adults with asthma, medium a high traffic exposure increases the likelihood of daily or weekly asthr symptoms by 40 percent and 80 percent, respectively, compared wit low traffic exposure. The policy brief also notes that living in areas of heavy traffic is a burden borne disproportionately by asthma sufferei who are ethnic/racial minorities or from low-income households.

Researchers were able to link traffic-related air pollution to asthma severity after merging data from Los Angeles and San Diego County respondents to the 2001 California Health Interview Survey with trai counts provided by the California Department of Transportation.

You may also be interested in these other publications:

California's Racial and Ethnic Minorities More Adversely Affected by Asthma

An Analysis of California Assembly Bill 2185: Mandating Coverage of Pediatric Asthma Self-Management Training and Education (*Health Services Research*)

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UCLA Health Policy Research Brief

August 2006

Living Near Heavy Traffic Increases Asthma Severity

Ying-Ying Meng, Rudolph P. Rull, Michelle Wilhelm, Beate Ritz, Paul English, Hongjian Yu, Sheila Nathan, Marlena Kuruvilla, E. Richard Brown

Children and adults who suffer from asthma and live near heavy vehicular traffic are nearly three times more likely to visit the emergency department or be hospitalized for their condition than those who live near low traffic density. For adults with asthma, medium to high traffic exposure increases the likelihood of chronic symptoms by approximately 40% to 80%.

Moreover, living in areas of heavy traffic is a burden borne disproportionately by asthma sufferers who are ethnic/racial minorities or from low-income households. The issue is more pronounced among children than adults with asthma.

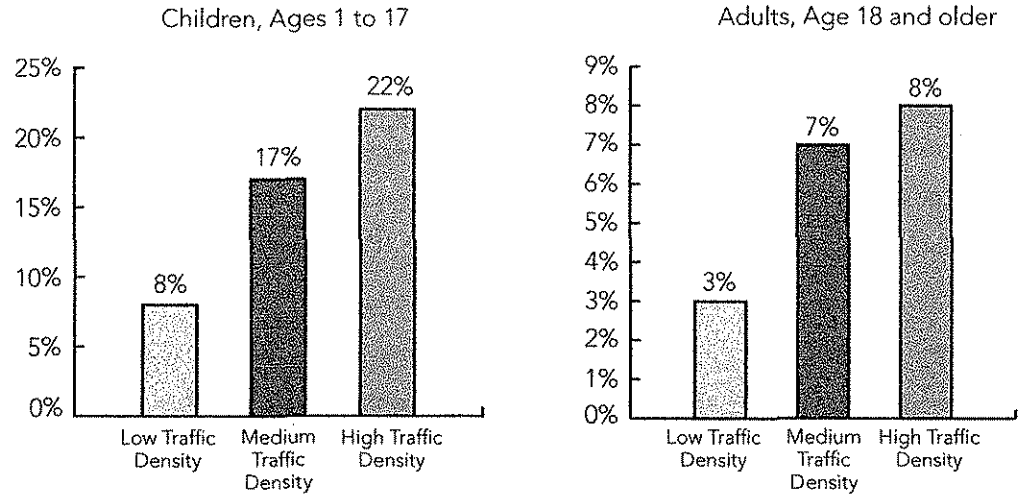
Asthma is one of the most common chronic respiratory disorders in the United States. According to the 2001 California Health Interview Survey (CHIS 2001), nearly 400,000 children (12.1% of total) and over 900,000 adults (10.2% of total) in the two largest counties of California—Los Angeles and San Diego—have been diagnosed with asthma at some point in their lives, with many of them suffering from severe asthma. Among children with asthma, approximately 10% suffer from daily or weekly symptoms and 11% have had an asthma-related emergency department (ED) visit or hospitalization in the year prior to the interview. Among adults with asthma, 23% report daily or weekly symptoms and 8% report an asthma-related ED visit or hospitalization.

Airway inflammation is a principal characteristic of asthma and is directly related to asthma severity as a function of acute and chronic airflow obstructions.[1] Air pollution can worsen asthma symptoms by causing inflammatory reactions in the lungs. For instance, ozone, a reactive gas that results primarily from the action of sunlight on hydrocarbons and nitrogen oxides emitted during fuel combustion, can act as a powerful respiratory irritant. In developed countries, traffic exhaust is one of the most important sources of outdoor air pollution. Truck, car, bus and other traffic emissions produce a complex mixture of toxic chemicals (e.g., benzene, particulate matter, and a variety of irritant gases, including nitrogen dioxide, sulfur dioxide, and ozone).[2] Between 1982 and 2001, Vehicle Miles Traveled (VMT) on California roadways increased 97% while the state population increased 40%[3], reflecting a potential increase in exposure to vehicle traffic emissions.

To examine the relationship between traffic-related air pollution and asthma severity, data from respondents of Los Angeles and San Diego County to the 2001 California Health Interview Survey were linked to traffic count data provided by the California

Support for this policy brief was provided by the Agency for Toxic Substances and Disease Registry, Centers for Disease Control and Prevention

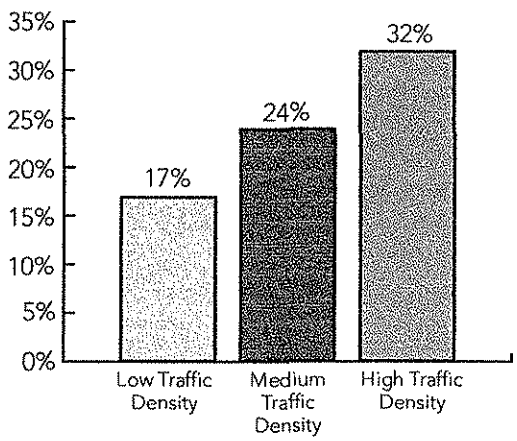
Exhibit 1 **Prevalence of Asthma-related ED Visits or Hospitalizations by Traffic Density**



Sources: 2001 California Health Interview Survey; California Department of Transportation.

Department of Transportation (Caltrans). This policy brief addresses whether individuals with asthma are more likely to experience daily or weekly symptoms, or have ED visits or hospitalizations for asthma, if exposed to high levels of traffic near their homes.

Exhibit 2 **Prevalence of Daily or Weekly Asthma Symptoms by Traffic Density (Adults, Age 18 and Older)**



Sources: 2001 California Health Interview Survey; California Department of Transportation.

Heavy Traffic Near Homes Associated with Increase in Severe Asthma

Traffic density was estimated based on the CHIS 2001 respondents' reported residential street and intersecting cross-street. Daily traffic-count data collected by Caltrans in 2000 along roads within 500 feet of the respondents' residential streets were aggregated to estimate residential traffic-density levels (see Data Sources and Methods for more details). The residential traffic-density values, measured as Vehicle Miles Traveled (VMT) per square mile, of the respondents were categorized into three levels: high traffic (daily VMT/mi^2 200,001), medium traffic (daily VMT/ mi^2 = 20,000-200,000), and low traffic exposure (daily VMT/mi^2 < 20,000). These cut-off points correspond roughly to the 20th percentile of the distribution in the population; i.e., those in the highest exposure group have traffic values in the top 20% of the population while those in the lowest exposure category represent the lowest 20% of traffic density in the population.

Emergency department visits or hospitalizations due to asthma are thought to be largely preventable, as they may reflect inadequate control of asthma through both appropriate primary care and/or decreases in exposure to environmental triggers. Increasing exposure to traffic is associated with having an asthma-related ED visit or hospitalization in the year prior to the interview. Comparing the highest with the lowest category of traffic levels, both children and adults with asthma in the highest category are almost three times more likely to utilize these services than those in the lowest category (Exhibit 1). This may be due to children with an acute exacerbation, especially the younger ones, more likely to be taken to the ED or hospital by their parents.

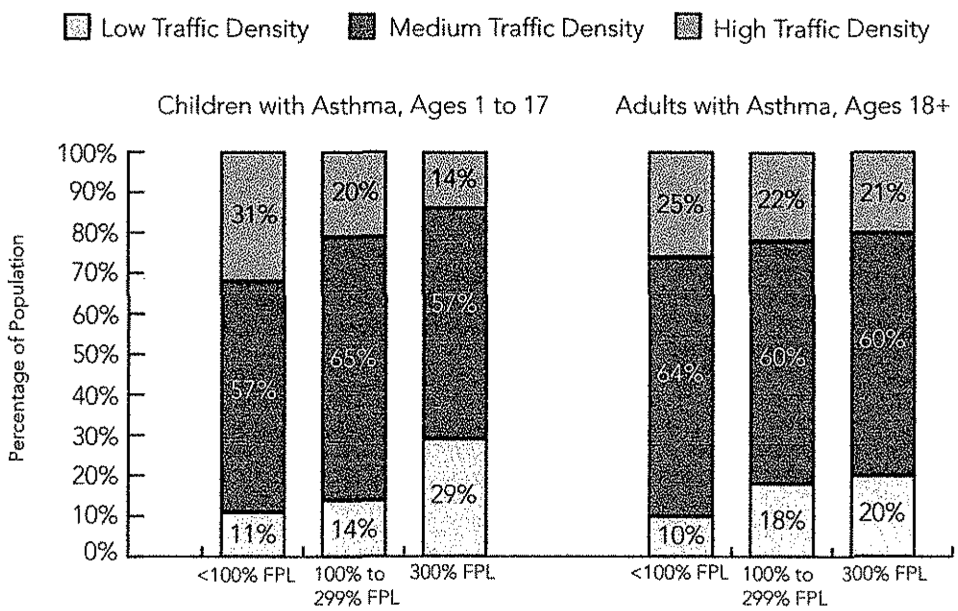
For adults but not children with asthma, the prevalence of daily or weekly symptoms is also associated with increasing exposure to traffic. Medium and high traffic exposure increases the likelihood of chronic symptoms by approximately 40% and 80%, respectively, compared with low traffic exposure (Exhibit 2). These estimates are adjusted for age, gender, race/ethnicity and household poverty level.

Low-Income and Racial/Ethnic Minority Groups Have Higher Prevalence and Exposures

Higher rates of severe asthma disproportionately affect low-income and racial/ethnic minority groups.[4] Individuals with asthma from low-income households (below 100% of the federal poverty level (FPL) are more likely to have daily or weekly symptoms, or an asthma-related ED visit or hospitalization. Likewise, Latinos and African Americans are more likely to utilize emergency services or hospitalizations for asthma, while daily or weekly symptoms are more commonly reported by the White population.

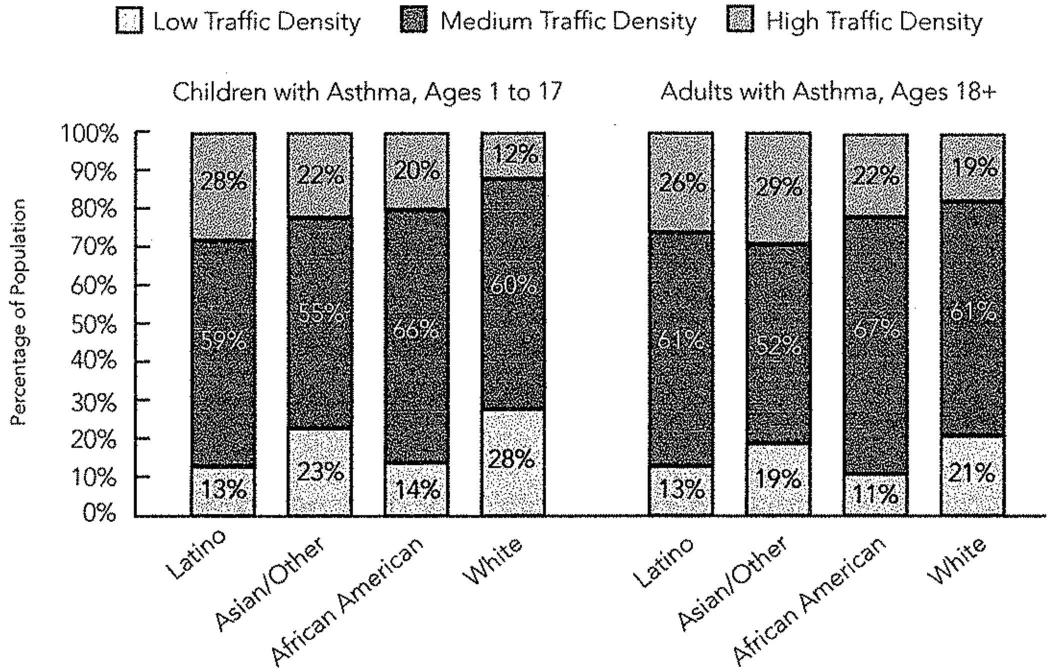
High-traffic levels near homes are more common among people with asthma who are racial/ethnic minorities or from low-income households. This may be due to limited housing choices, with affordable housing more likely to be located near streets with heavy traffic. This disparity is most pronounced among children with asthma, where those living in households below the federal poverty

Traffic Density by Federal Poverty Level Among Persons With Asthma **Exhibit 3**



Sources: 2001 California Health Interview Survey; California Department of Transportation.

Exhibit 4 **Traffic Density by Race/Ethnicity Among Persons With Asthma**



Sources: 2001 California Health Interview Survey; California Department of Transportation.

level are twice as likely to live near high-traffic areas as those from households at or above 300% FPL.[5] Adults with asthma from households below the federal poverty level are 10% more likely to have median- or high-residential traffic levels than those from households at or above 300% FPL (Exhibit 3).

Latino children with asthma are nearly two-and-a-half times more likely than White children to live near heavy traffic, while Asians/Others and African-American children are almost twice as likely. Among adults with asthma, racial/ethnic minorities are also more likely to be exposed to high traffic than Whites (Exhibit 4). The findings are consistent with previous studies.[6]

Policy Recommendations

This study adds to the body of evidence suggesting that further reduction of traffic-related air pollution is needed to reduce the burden of asthma, especially among low-income and racial/ethnic minority groups. While air quality improvements in the last few decades have been impressive, additional emission controls are needed to offset population growth and vehicle miles traveled in California. Currently, levels of ozone and particulate matter air pollution remain unhealthy in many parts of the country. Even in areas that are meeting the National Ambient Air Quality Standards, existing air quality levels may still adversely affect sensitive populations, such as those with asthma.[7] Control of motor vehicle emissions will be an important measure to help reduce the overall burden of asthma, especially in urban areas. Reduction of air pollution requires commitment from the government, industries and communities.

In addition to air pollution control measures, public and private efforts should also be made to reduce exposure to air pollution. New developments of schools, day care centers, houses, offices, or other facilities such as government-subsidized housing, should consider proximity to busy roadways, especially freeways. The California Legislature passed SB351 in 2003 that prohibits the approval by the governing board of a school district for a school site that is within 500 feet from the edge of a freeway or other busy traffic corridor. Health-care providers should not only make sure that appropriate asthma medications are taken, but also advise their patients and families to be aware of outdoor air pollution effects on asthma. However, it is also important to increase awareness of indoor asthma triggers, such as dust mites, indoor allergens and chemicals; to prohibit smoking indoors; and to discourage children and adults from smoking. All these steps can help create asthmatic-friendly environments and reduce the overall burden of asthma on individuals, families and society.

Data Sources and Methods

The data related to asthma are from the 2001 California Health Interview Survey (CHIS 2001) collected during November 2000 and September 2001. CHIS 2001 is a two-stage, geographically stratified, random-digit-dial telephone survey of California adults, adolescents and children, and was conducted in 55,428 California households. The interviews were conducted in English, Spanish, Chinese (Mandarin and Cantonese dialects), Vietnamese, Korean and Khmer (Cambodian) to obtain information on demographic characteristics, health-related behaviors, health status and conditions, access to health care and insurance coverage.

We developed a traffic-density measure for each CHIS 2001 respondent based on their reported street of residence and nearest cross-street. Using these data, we identified each subject's "probable home street segment" and all roadways within a 500-foot buffer that had an Annual Average Daily Traffic (AADT) value from the Caltrans for the year 2000. Similar to previous studies, the traffic density value for each subject was estimated by first calculating the Vehicle Miles Traveled (VMT) for each road segment with a traffic count within the buffered area; VMT was estimated by multiplying the AADT by the road segment length.[8,9] Traffic Density was then calculated as the sum of the VMT for all road segments in the buffer divided by the area of the buffer. Subjects with no Caltrans-counted streets within their buffers (n = 155 in Los Angeles and San Diego) were included in the low-traffic referent category, as it was assumed these individuals had only small, residential streets near their homes.

Author Information

Ying-Ying Meng, DrPH, is a Senior Research Scientist at the UCLA Center for Health Policy Research. Rudolph Rull, PhD, is a Research Scientist, Northern California Cancer Center, (formerly an Assistant Researcher at the UCLA Center for Health Policy Research). Michelle Wilhelm, PhD, is an Adjunct Assistant Professor of Epidemiology in the UCLA School of Public Health. Beate Ritz, MD, PhD, is Vice Chair, Department of Epidemiology, and Associate Professor of Epidemiology, Environmental Health Sciences and Neurology, UCLA Schools of Public Health and Medicine. Paul English, PhD, MPH, is a Branch Scientific Advisor, Environmental Health Investigations Branch, California Department of Health Services. Hongjian Yu, PhD, is Associate Director of Statistical Support and Programming at the UCLA Center for Health Policy Research. Sheila Nathan, MPH, is a Research Assistant at the UCLA Center for Health Policy Research. Marlena Kuruvilla, MSW/MPH, is a Senior Research Associate at the UCSF Institute for Health Policy Studies (formerly a Research Assistant at the UCLA Center for Health Policy Research). E. Richard Brown, PhD, is the Director of the UCLA Center for Health Policy Research, Professor of Public Health in the UCLA School of Public Health, and Principal Investigator for the California Health Interview Survey.

Suggested Citation

Meng YY, Rull RP, Wilhelm M, Ritz B, English P, Yu H, Nathan S, Kuruvilla M and Brown ER. Living Near Heavy Traffic Increases Asthma Severity. Los Angeles: UCLA Center for Health Policy Research, 2006.

UCLA CENTER FOR HEALTH POLICY RESEARCH

The UCLA Center for Health Policy Research is based in the UCLA School of Public Health and is also affiliated with the UCLA School of Public Affairs.

Editor-in-Chief: E. Richard Brown PhD

Phone: 310-794-0909
Fax: 310-794-2686
Email: chpr@ucla.edu
Website: www.healthpolicy.ucla.edu

Notes

1 Delfino RJ. Epidemiologic evidence for asthma and exposure to air toxics: linkages between occupational, indoor, and community air pollution research. Environmental Health Perspectives 2002;110 Suppl 4: 573-89.

2 Trasande L, Thurston GD. The role of air pollution in asthma and other pediatric morbidities. The Journal of Allergy and Clinical Immunology 2005;115(4):689-99.

3 CARB. The California Almanac of Emissions and Air Quality. http://www.arb.ca.gov/aqd/almanac/almanac05/almanac05.htm. 2003.

4 Meng YY, Babey SH, Malcolm E, Brown ER, Chawla N. Asthma in California: Findings from the 2001 California Health Interview Survey: UCLA Center for Health Policy Research; 2003.

5 In 2001, the annual income at 100% of the Federal Poverty Level (FPL) was $9,039 for one person, $11,569 for a family of two, $14,128 for a family of three, and $18,104 for a family of four. The incomes at 300%+ FPL were three times these amounts, respectively (e.g. the annual income at 300%+ FPL was $27,117 or more for one person).

6 Gunier RB, Hertz A, Von Behren J, Reynolds P. Traffic density in California: socioeconomic and ethnic differences among potentially exposed children. Journal of Exposure Analysis and Environmental Epidemiology 2003;13(3):240-6.

7 Gent JF, Triche EW, Holford TR, Belanger K, Bracken MB, Beckett WS, et al. Association of low-level ozone and fine particles with respiratory symptoms in children with asthma. JAMA 2003;290(14):1859-67.

8 Reynolds P, Von Behren J, Gunier RB, Goldberg DE, Hertz A. Residential exposure to traffic in California and childhood cancer. Epidemiology 2004;15(1):6-12.

9 English P, Neutra R, Scalf R, Sullivan M, Waller L, Zhu L. Examining associations between childhood asthma and traffic flow using a geographic information system. Environmental Health Perspectives 1999;107(9):761-7.

UCLA Center for Health Policy Research
10960 Wilshire Boulevard, Suite 1550
Los Angeles, CA 90024

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DEPARTMENT OF
CITY PLANNING
200 N. SPRING STREET, ROOM 525
LOS ANGELES, CA 90012-4801
AND
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VAN NUYS, CA 91401

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ANTONIO R. VILLARAIGOSA
MAYOR

EXECUTIVE OFFICES

S. GAIL GOLDBERG, AICP
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(213) 978-1271

VINCENT P. BERTONI, AICP
DEPUTY DIRECTOR
(213) 978-1272

JOHN M. DUGAN, AICP
DEPUTY DIRECTOR
(213) 978-1274

EVA YUAN-MCDANIEL
DEPUTY DIRECTOR
(213) 978-1273

FAX: (213) 978-1275

INFORMATION
(213) 978-1270
www.planning.lacity.org

January 26, 2009

To: Honorable City Planning Commission
Room 272, City Hall

From: S. GAIL GOLDBERG
Director of Planning

Subject: Housing in Proximity to Freeways

On August 14, 2008, the City Planning Commission held a forum by a panel of experts regarding the implications of living in close proximity to freeways. The panel, which presented a variety of perspectives, included Professor Manuel Pastor, Dr. Rob McConnell, Professor of Preventive Medicine and Deputy Director, Children's Environmental Health at USC, Dr. Andrea Hricko, Associate Professor of Clinical Preventive Medicine at USC and Director of Community Outreach and Education for the Southern California Health Sciences Center, and representatives of several community groups and non-profits working on health issues in Wilmington. The Commission requested that staff report back with recommendations regarding actions the City might take to address the issues raised by the panel. This report is a response to the Commission's request.

Summary of Health Effects

Many studies have been conducted over the past several decades documenting the link between health and air pollution, particularly certain gases and particulates. While there appears to be a general consensus that heightened levels of air pollutants have detrimental affects on human health, there are differing views on the specifics (i.e. distance from sources, the role of technology, effectiveness of mitigation, etc.).

One of the more recent studies[1] by Rob McConnell and his colleagues at USC and published in the Lancet in January, 2007, measured various pollutants at distances of 500 meters (approximately 1,640 feet), 500 m to 1,000 m, and 1,000 m to 1,500 m of a freeway, and from 75 m (approximately 246 feet), 150 m, and 300 m from non-freeway major roads and correlated such levels to the health of children. The study found that "residential proximity to freeway traffic is associated with substantial deficits in lung-function development ..." and that "local exposure to large roadways are associated with diminished lung-function development in children."

[1] Effect of exposure to traffic on lung development from 10 to 18 years of age: a cohort study. The Lancet, Vol. 368, 2006.

The study also suggested that "children who live close to a freeway in a high pollution area experience a combination of adverse developmental effects because of both local and regional pollution."

While the study discussion hypothesized that a "pollutant such as elemental carbon could explain our reported health effects both locally and regionally," it also indicated that "[a]dditional research is needed to identify the specific traffic pollutants that bring about health effects, and to elucidate the contribution of each pollutant to regional and local associations."

How Vehicles Create Air Pollution

The power to move a vehicle with a combustion engine comes from burning fuel. Air pollution results from the by-products of the combustion process and from evaporation of the fuel itself. Incomplete combustion releases chemicals which combine with heat and air to create secondary pollutants such as ozone. The combustion process also creates particulate matter emissions, typically referred to by their size: equal to or less than 10 microns (PM_{10}) or less than 2.5 microns ($PM_{2.5}$). While diesel exhaust is one of the primary contributors to particulate matter air pollution, all motor vehicles, including alternative fuel, hybrid, and electric, generate such particles through the normal wear and degradation of tires, brakes, and other components, and contribute to dust pollution (particulates) by re-suspending settled particulates back into the air.

Regulations and Standards for Air Pollution

Within the State of California, there are two standards for air pollution concentrations that must be met. The first, a federal standard, is implemented through the Clean Air Act and enforced by the U.S. Environmental Protection Agency (EPA). The federal standard regulates a number of criteria pollutants, including suspended particulate matter. The second, more stringent standard, is implemented through the California Clean Air Act and enforced by the State of California Environmental Protection Agency (Cal/EPA) and various other State agencies, such as the California Air Resources Board (CARB) and the South Coast Air Quality Management District (SCAQMD). These agencies set health-based air quality standards, identify and set control measures for toxic air contaminants, and establish and enforce emission standards (including those for motor vehicles and fuels). Standards have been adopted for PM_{10}, $PM_{2.5}$ and other criteria air pollutants.

At the regional level, the Southern California Association of Governments (SCAG), as a designated Metropolitan Planning Organization, is mandated by the federal government to research and plan for regional transportation, growth management, hazardous waste management, and air quality. Under the federal Clean Air Act, SCAG is responsible for determining project, plan, and program conformity with adopted Air Plans.

The City of Los Angeles, through the General Plan and various land use decision-making bodies, implements some of the objectives of the EPA, CARB, SCAQMD, and SCAG on a project-by-project basis.

Objective 4.3 of the adopted Air Quality General Plan Element states: "It is the objective of the City of Los Angeles to ensure that land use plans separate major sources of air pollution from sensitive receptors such as schools, hospitals and parks." Policy 4.3.1 reads: "Revise the City's General Plan/Community Plans to ensure that new or relocated sensitive receptors are located to minimize significant health risks posed by air pollution sources."

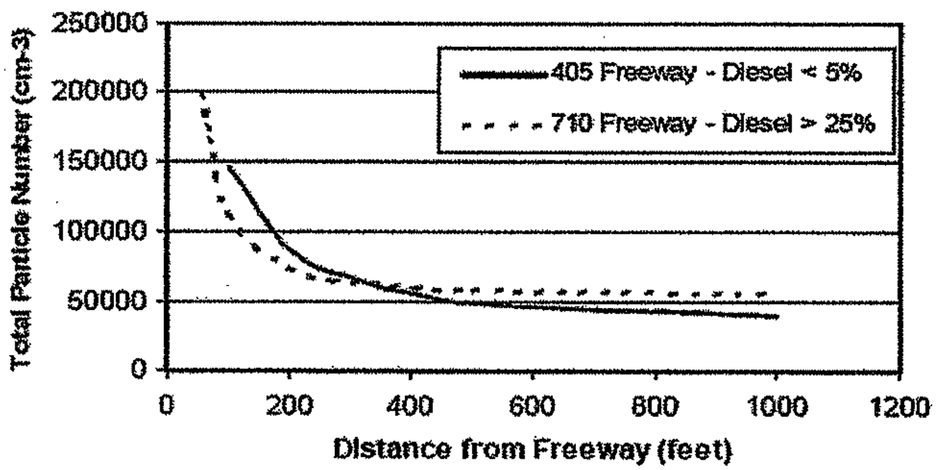
Regional and Local Air Quality

In the 2007 regional Air Quality Management Plan (AQMP), prepared by SCAQMD, the Los Angeles Air Basin remains as a nonattainment area for ozone[2] and $PM_{2.5}$ at both State and Federal standards, and PM_{10} at State standards. Nonattainment for these criteria pollutants is projected through and beyond 2024. This year, a petition has been sent to the U.S. Environmental Protection Agency to re-designate the Basin as an attainment area for carbon monoxide (CO) emissions. For all other Federal criteria pollutants, the Basin has maintained emissions at or below threshold concentration levels.

According to the AQMP, the following are recognized as the health effects associated with particulate matter:

> A consistent correlation between elevated ambient fine particulate matter (PM_{10} and $PM_{2.5}$) levels and an increase in mortality rates, respiratory infections, number and severity of asthma attacks and the number of hospital admissions has been observed in different parts of the United States and various areas around the world. In recent years, studies have reported an association between long-term exposure to air pollution dominated by fine particles ($PM_{2.5}$) and increased mortality, reduction in life-span, and an increased mortality from lung cancer.
>
> Daily fluctuations in fine particulate matter concentration levels have also been related to hospital admissions for acute respiratory conditions, to school and kindergarten absences, to a decrease in respiratory function in normal children and to increased medication use in children and adults with asthma. Recent studies show lung function growth in children is reduced with long-term exposure to particulate matter. The elderly, people with pre-existing respiratory and/or cardiovascular disease and children appear to be more susceptible to the effects of PM_{10} and $PM_{2.5}$.

While the ambient air in the basin does not meet established standards for some criteria pollutants, the following chart shows the concentration of particulates in relation to distance from a freeway. As can be seen, particulate matter concentrations appear to approach the basin's ambient concentration levels around 500 feet from the freeway source.



SCAQMD Air Quality Issues in School Site Selection Guidance Document, Revised May 2007.

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[2] The entire air basin is classified as an extreme nonattainment area for ozone, with concentrations exceeding 0.20 ppm (parts per million). 2007 AQMP, pg. 1-21.

What has the State done?

The Air Resources Board has taken many regulatory actions to mitigate the health problems associated with traffic pollution. In September 2000, the ARB approved the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles (Diesel Risk Reduction Plan)*, which proposed a comprehensive plan to significantly reduce diesel-related particulate matter emissions. The plan, presently being implemented, has required retro-fits of older vehicles, increased emission standards for new vehicles, and most recently, required further decreases in diesel-fuel sulfur content. In April 2006, the ARB's *Emission Reduction Plan for Ports and Goods Movement* was approved, a comprehensive plan to limit emissions from diesel engines associated with the goods movement industry. The plan is part of the State's overall Goods Movement Action Plan, unveiled by CalEPA in January of this year, to improve goods movement, reduce congestion, and improve air quality associated with moving goods via the state's highways, railways, and ports. Smog checks are used for passenger vehicles, and tighter standards for cars and light trucks will be implemented in 2009.

State Guidelines

In addition to the actions identified above, in May 2005, the State issued land use guidelines to assist planners in considering air pollution issues in the development of land use plans and policies. SCAQMD's *Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning: A Reference for Local Governments Within the South Coast Air Quality Management District*, sets forth a number of goals, objectives, and policies that local jurisdictions can adopt within their General Plans to encourage the reduction of overall air pollution and minimize the exposure of sensitive receptors. Suggested Policy/Strategy AQ 1.1.4 from the *Guidance Document* states:

> Encourage the applicants for sensitive land uses (e.g., residences, schools, daycare centers, playgrounds and medical facilities) to incorporate design features (e.g., pollution prevention, pollution reduction, barriers, landscaping, ventilation systems, or other measures) in the planning process to minimize the potential impacts of air pollution on sensitive receptors.

Effectiveness of Mitigation Measures

Possible measures to mitigate the impacts of exposure to air pollutants citywide, as well as adjacent to freeways, include active air filtration systems, passive filtering through vegetation, site planning, building design, truck/bus/automobile fuel formulation, increased fuel efficiency standards, and the regulation of specified land uses. While there are differing views on the effectiveness of these measures, some have proven very effective.

Air filtration systems have improved over the years and are now extremely effective, even with regard to fine particulates. The American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) has created the Minimum Efficiency Reporting Value (MERV) rating system based on a scale of increasing effectiveness. As can be seen in the following table, a commonly available MERV 8-rated filter captures 70% of particles having a 3.0 - 10.0 micron diameter, while a MERV 11 filter has a capture efficiency of at least 85% for the same size particles, and is also capable of capturing between 65% and 80% of particles having a diameter of between 1.0 – 3.0 microns. By comparison, a MERV 13 filter captures at least 90% of particles having a 1.0 - 10 micron diameter and 75% of particles between 0.2 and 1.0 micron in diameter.

Effectiveness of MERV Rated Filters on Various Sized Particles

MERV RATING	Composite Average Particle Size Efficiency, % in Size Range, µm Range 1 (0.3 – 1.0)	Range 2 (1.0 – 3.0)	Range 3 (3.0 – 10.0)
1	n/a	n/a	E3 < 20
2	n/a	n/a	E3 < 20
3	n/a	n/a	E3 < 20
4	n/a	n/a	E3 < 20
5	n/a	n/a	20 ≤ E3 < 35
6	n/a	n/a	35 ≤ E3 < 50
7	n/a	n/a	50 ≤ E3 < 70
8	n/a	n/a	70 ≤ E3
9	n/a	E2 < 50	85 ≤ E3
10	n/a	50 ≤ E2 < 65	85 ≤ E3
11	n/a	65 ≤ E2 < 80	85 ≤ E3
12	n/a	80 ≤ E2	90 ≤ E3
13	E1 < 75	90 ≤ E2	90 ≤ E3
14	75 ≤ E1 < 85	90 ≤ E2	90 ≤ E3
15	85 ≤ E1 < 95	90 ≤ E2	90 ≤ E3
16	95 ≤ E1	95 ≤ E2	95 ≤ E3

Source: ASHRAE

Specific programs targeted at emissions from diesel-powered vehicles will result in lowered particulate matter through fuel reformulation and engine catalyst enhancements. Increasing proportions of the state- and region-wide percentage of hybrid- and electric-powered vehicles will also result in lowered pollution levels over the long-term.

Other pollutants can be reduced through regulations promulgated by SCAQMD and/or by local jurisdictions, mainly through reducing use of Volatile Organic Chemical-containing lubricants, solvents, and paints (to address ozone creation); facilities modernization; use of more energy and fuel efficient appliances and vehicles; control of construction- and erosion-related dust; and the paving/stabilizing of unpaved roadways, shoulders, and parking lots.

The use of vegetation can also provide a degree of mitigation. Trees, such as pines, that have a high degree of surface area can capture particulates as well as absorb some gases.

Attention to site planning for development projects near freeways can reduce exposure to pollutants by locating play areas for children as far as possible from freeways, eliminating operable windows facing freeways, and other measures.

LAUSD Action Regarding Schools Near Freeways

The Los Angeles Unified School District (LAUSD), through its Office of Environmental Health and Safety (OEHS), has tracked the science of freeway pollution and public health for a number of years. In 2003, the California Legislature enacted SB 352, which precludes the siting of public schools within 500 feet of a freeway, unless it can be shown that any significant health risk can be mitigated. The law also established a methodology for showing when the risks are mitigated. OEHS has issued "distance criteria" for school siting, establishing a 500-foot buffer from freeways, and similar setbacks from rail lines, high power transmission lines, hazardous material pipelines, landfills, and industrial facilities. The criterion precludes the siting of new schools within the buffer unless the Board of Education finds that either 1) the risk can be adequately mitigated or 2) that all feasible mitigation has been implemented, no alternative sites are available, and the benefits of the project outweigh the risks.

OEHS inventoried LAUSD schools within 500 feet of a freeway and prioritized them with regard to the degree of health risk from the effects of air pollution. LAUSD convened four inter-agency working groups of more than 50 experts to address the issue (inter-agency coordination, filtration, transportation and busing, and outdoor exposure). The working groups issued a report

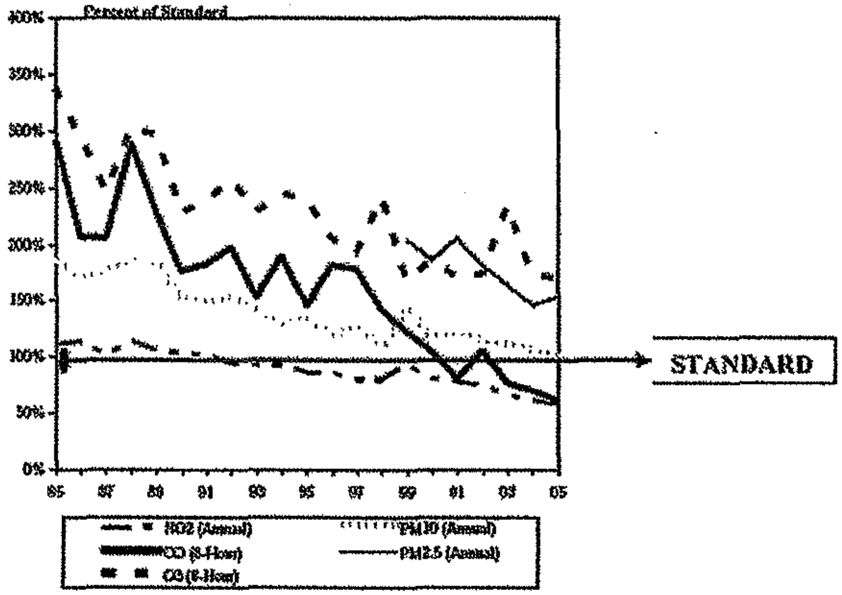
On October 2, 2008, that includes a review of recent studies and a set of recommendations from each of the four groups. The recommendations address the use of filters for both particulates and gases, actions related to vehicles and buses, the impact of technology, ways to reduce vehicle miles traveled, the design and use of outdoor space, and legislation.

Staff has discussed the issue with LAUSD's OEHS staff, who are very willing to share information, partner with the City, make a presentation to the Commission, or participate in the development of appropriate polices and legislation regarding this issue.

Recommendations

Through on-going and proposed programs implemented at the federal, state, and district levels, overall air pollution levels in the LA basin are declining, as depicted below.

MAXIMUM POLLUTANT CONCENTRATIONS AS A PERCENTAGE OF FEDERAL STANDARDS (SCAQMD 2007 AIR QUALITY MANAGEMENT PLAN)



The City has already implemented several measures recommended by the Air Resources Board and the South Coast Air Quality Management District that will result in air pollution reductions: Transit- and Pedestrian Oriented Districts, mixed-use development, and adaptive reuse all result in a more diverse offering of housing and commercial services that in turn reduce vehicle trips and vehicle miles traveled.

Rapidly changing technology will also affect ambient air quality levels. Serendipitously, higher fuel prices have led to increasing demand for high-efficiency gasoline, hybrid gas/electric, alternative fuel, and all-electric vehicles. While these vehicles still result in some contribution to re
gional air pollution, their proportion will be significantly less than today.

With regard to continuing site-specific air quality reports/studies to characterize a project's individual exposure to air pollutants when located within 500 feet of a freeway, staff does not believe that they are practical or beneficial as it is clear and accepted that there is a further diminishment of ambient air quality as a result of freeway proximity. Further, the available mitigation measures generally remain the same whether the project is located in an area of relatively high or low air pollution concentration. According to the SCAQMD, the Los Angles Air Basin has maintained air pollutant levels at or below State and Federal thresholds for all criteria pollutants except particulate matter and ozone. Requirement of air quality studies due to freeway proximity is burdensome on the project proponent and would not yield information that is not already known or could be assumed.

In order to minimize exposure to increased air pollution levels generated by vehicles traveling along major highways, freeways, rail lines, and in industrial areas throughout the city, staff recommends the following thresholds and mitigation measures:

Threshold: Citywide – all new construction

- Install and maintain an air filtration system having efficiency equal to or exceeding ASHRAE Standard 52.2 MERV 11.

Threshold: Citywide – all commercial and industrial uses; and residential uses that front on a Major Highway or are located adjacent to an active heavy rail line

- Install and maintain an air filtration system having efficiency equal to or exceeding ASHRAE Standard 52.2 MERV 12.
- Project components shall be oriented to place actively and passively utilized outdoor areas as far from the roadway as possible.

Threshold: All uses within 500 feet of a freeway

- Install and maintain an air filtration system having efficiency equal to or exceeding ASHRAE Standard 52.2 MERV 13 (excluding storage/warehouse areas or garages).
- Unless otherwise required, windows facing a freeway shall not be operable.
- Project components shall be oriented to place actively and passively utilized outdoor areas as far from the roadway as possible.
- The property perimeter nearest the freeway(s) shall be landscaped with a dense mixture of shrubs and trees to maximize passive filtration of particulate air contaminates.
- Reduce and/or prohibit outdoor school/childcare activity when the Air Quality Index exceeds 100 (Unhealthy for Sensitive Groups).
- Prohibit outdoor school/childcare activity when the Air Quality Index exceeds 150 (Unhealthy).

Additional mitigation measure to be used as appropriate, depending on site-specific conditions:

- Actively utilized outdoor spaces shall not be permitted. All active recreational uses shall be conducted within the interior of a structure having an air filtration system with efficiency equal to or exceeding ASHRAE Standard 52.2 MERV 13.

Additional work program item

- Work with CalTrans to develop landscape plans for freeway rights-of-way that will reduce exposure to criteria air pollutants for people living, working and using outdoor recreation areas within 500 feet of freeways.

NRDC

THE EARTH'S BEST DEFENSE

NATURAL RESOURCES DEFENSE COUNCIL

CERA
California
Environmental
Rights Alliance

March 11, 2009

The Honorable William Roschen, President
and Members of the Planning Commission
City of Los Angeles Planning Commission
200 North Spring Street, Room 525
Los Angeles, California 90012-4801

Dear Mr. Roschen and Members of the Planning Commission:

On behalf of the Natural Resources Defense Council and the California Environmental Rights Alliance, we write to encourage the Planning Commission to protect Los Angeles residents from air pollution generated by freeways, highways, and heavily travelled roadways.

As the Commission is aware, living, working, and going to school in close proximity to major roadways can have significant and lasting impacts on public health—particularly on the health of children and other sensitive populations. Elevated levels of air pollutants from traffic exhaust are associated with adverse childhood health effects, such as premature birth, low birth weight, respiratory allergies, decreased lung function, bronchitis and asthma onset and exacerbation. Scientific evidence also demonstrates that, in addition to being exposed to fine particulate matter (*i.e.*, PM10 and PM2.5), individuals living, working and going to school near major roadways are also exposed to "ultra-fine particles" (particles less than 0.1 micron in diameter), which may be more harmful to health than either PM10 or PM2.5. While the United States Environmental Protection Agency ("EPA") currently regulates fine particles, it has not yet developed standards for the regulation of particles in the ultra-fine range. As a result, *no one* is ensuring that the public is protected from ultra-fine particles. Moreover, it is our understanding that these particles may be too small to capture in air filters, and as a result, there may not be any technologies in existence that can sufficiently protect the public from exposure to ultra-fine PM.

Based on such health data, and the fact that nearly 1.5 million people already live within 300 meters (984.25 feet) of a major roadway in the South Coast Air Basin, the Planning Commission should take this opportunity to use its authority to ensure that *future* land use decisions are fully informed and health-protective. Indeed, given what we know today, we should no longer allow daycare facilities, schools, homes, senior care facilities, or hospitals to be sited in close proximity to major roadways. Accordingly, we recommend that the Commission direct staff to revise the director's report and develop a policy for consideration by the Commission that would require:

1) Any project that attracts sensitive receptors, (*e.g.*, schools and homes) that is within 1,000 feet[1] of a freeway, highway, or heavily travelled roadway should be required to complete an environmental impact report ("EIR") under the California Environmental Quality Act ("CEQA"). Each EIR should include an analysis of how air pollutants, including ultra-fine particles, from the nearby road may impact the health of individuals drawn to the project. As required by CEQA, all such projects should be required to include all feasible mitigation measures to reduce the potential adverse health and safety impacts from roadway related air pollution. Further, to the extent projects within 1,000 feet of a freeway are approved after an EIR is complete, property owners, property managers, and realtors should have a duty to provide those living, working, and being schooled at the project site full disclosure of the potential environmental and public health hazards associated with roadway related air pollution.

2) Projects that attract sensitive receptors should not be sited 500 feet from any a freeway, highway, or heavily travelled roadway.

Adopting a truly health protective standard for minimizing sensitive receptor exposure to air pollution would address an environmental *in*justice currently plaguing many low income children of color. Research performed on schoolchildren in the Los Angeles Unified School District concludes that children of color, namely Latinos and African Americans, bear the highest burden of estimated cancer and noncancer health risks associated with ambient air toxics exposures while they are in school.[2] Further, in California, low-income children of color are more likely to live in high traffic areas. Specifically, it has been shown that children of color are about three times more likely to live in high-traffic areas than white children. Based on this analysis, low-income and children of color have higher potential exposure to vehicle emissions.[3] The attached charts summarize these findings. Accordingly, our proposed recommendation would go a long way in preventing future inequities on these special populations.

Additionally, in developing the proposed policy, "heavily travelled roadway" and "sensitive receptor" must be adequately defined to ensure public health is sufficiently protected. To that end, we look forward to working with Commission staff to define "heavily travelled roadway" in a manner that is consistent with the most recent scientific literature that discusses the effects of roadway pollution on public health. Staff should also consider the definition of "sensitive receptor" used by the South Coast Air Quality Management District ("SCAQMD"), which includes any residence including private homes, condominiums, apartments, and living quarters;

[1] Scientific literature would support increasing this distance to beyond 1000 feet (*i.e.*, 1500 feet).
[2] Manual Pastor, Jr. & James Saad, *Integrating Environmental Justice and the Precautionary Principle in Research and Policy Making: The Case of Ambient Air Toxics Exposures and Health Risks Among Schoolchildren in Los Angeles*, Annals of the American Academy of Political and Social Science (Nov. 2002).
[3] Robert Gunier, *et al.*, *Traffic Density in California: Socioeconomic and Ethnic Differences Among Potentially Exposed Children*, Journal of Exposure Analysis and Environmental Epidemiology (2003).

education resources such as preschools and kindergarten through grade twelve (k-12) schools; daycare centers; playgrounds and athletic fields; and health care facilities such as hospitals or retirement and nursing homes. SCAQMD also considers sensitive receptors to include long-term care hospitals, hospices, prisons, and dormitories or similar live-in housing. (SCAQMD Rule 2701).

Lastly, in the past, some have argued that project proponents of, for example, a new school, should not be compelled under CEQA to examine the impact a nearby pollution source will have on schoolchildren. Critics have cited to *Baird v. County of Contra Costa*, 32 Cal. App. 4th 1464, 1468 (1995), which states that: "[t]he purpose of CEQA is to protect the environment from proposed projects, not to protect proposed projects from the existing environment." Using *Baird*, some might argue that our first recommendation above goes well-beyond what is required under the law. However, express statements in the CEQA Guidelines as well as by CEQA scholars have made clear that *Baird* should not be followed, and is, in fact, inconsistent with the fundamental tenants of CEQA.

For instance, CEQA Guidelines section 15126.2(a) states:

> The EIR shall also analyze any significant environmental effects the project might cause by bringing development and people into the area affected. For example, an EIR on a subdivision astride an active fault line should identify as a significant effect the seismic hazard to future occupants of the subdivision. The subdivision would have the effect of attracting people to the location and exposing them to the hazards found there.[4]

Further, even a cursory review of the CEQA initial study checklist, which was revised in 1998—three years after *Baird* was decided—makes clear that CEQA requires environmental documents to analyze the problems associated with locating new human activities in areas with incompatible land uses. For example, the checklist asks lead agencies to evaluate whether a project would expose people to earthquakes, strong seismic ground shaking, liquefaction, land slides, wildland fires, flooding, dam or levee failure, and inundation from seiche, tsunami, or mudflow. CEQA Guidelines, App. G §§ VI(a), VII(h), VIII(g)-(j).[5] Thus, in updating the Guidelines in 1998, the Resource Agency expressly directed lead agencies to examine the impacts created by siting a project in close proximity to an environmental hazard—indicating that *Baird* should not be read to eliminate such an inquiry. *See* Remy Thomas, *Guide to CEQA*, at 440-442 (11th Ed. 2007). Moreover, the outlying principle articulated in *Baird* has never been cited in a subsequent Court of Appeal opinion, nor has it been affirmed by the California Supreme Court.[6] For these reasons,

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[4] When *Baird* was decided in 1995, this provision was located at section 15126(a) of the CEQA Guidelines.
[5] Even the 1995 Initial Checklist (the checklist in existence when *Baird* was decided) asked whether a proposed project would involve "[e]xposure of people to existing sources of potential health hazards." Former CEQA Guidelines, App. I, § IX. The Court in *Baird* made no attempt to reconcile its holding with such fundamental tenants under CEQA.
[6] The only relevant citation to *Baird* in a published case appears in *Los Angeles Unified School District v. City of Los Angeles*, 58 Cal. App. 4th 1019, 1026 (1997). In that case, the court interpreted *Baird* narrowly, rejecting the

Baird cannot be used as a basis to ignore "proximity issues" under CEQA, or as a basis not to move forward with the health-protective recommendations outlined above.

Thank you for considering our comments.

Sincerely,

Melissa Lin Perrella
Staff Attorney
Natural Resources Defense Council

Joseph K. Lyou, Ph.D.
Executive Director
California Environmental Rights Alliance

Enclosure

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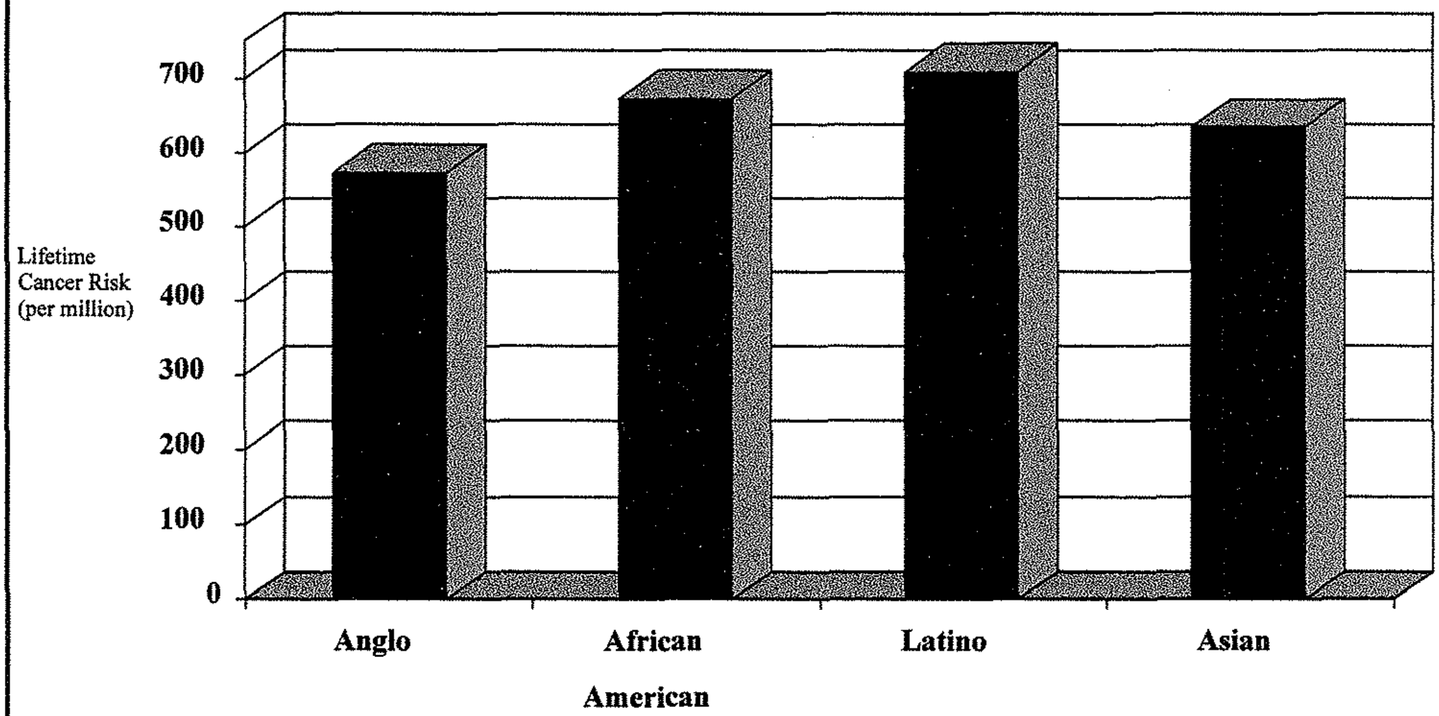
theory that *Baird* stood for the proposition that "an EIR need not consider the impact of a proposed project on a site where there are already adverse environmental consequences." *Id.*

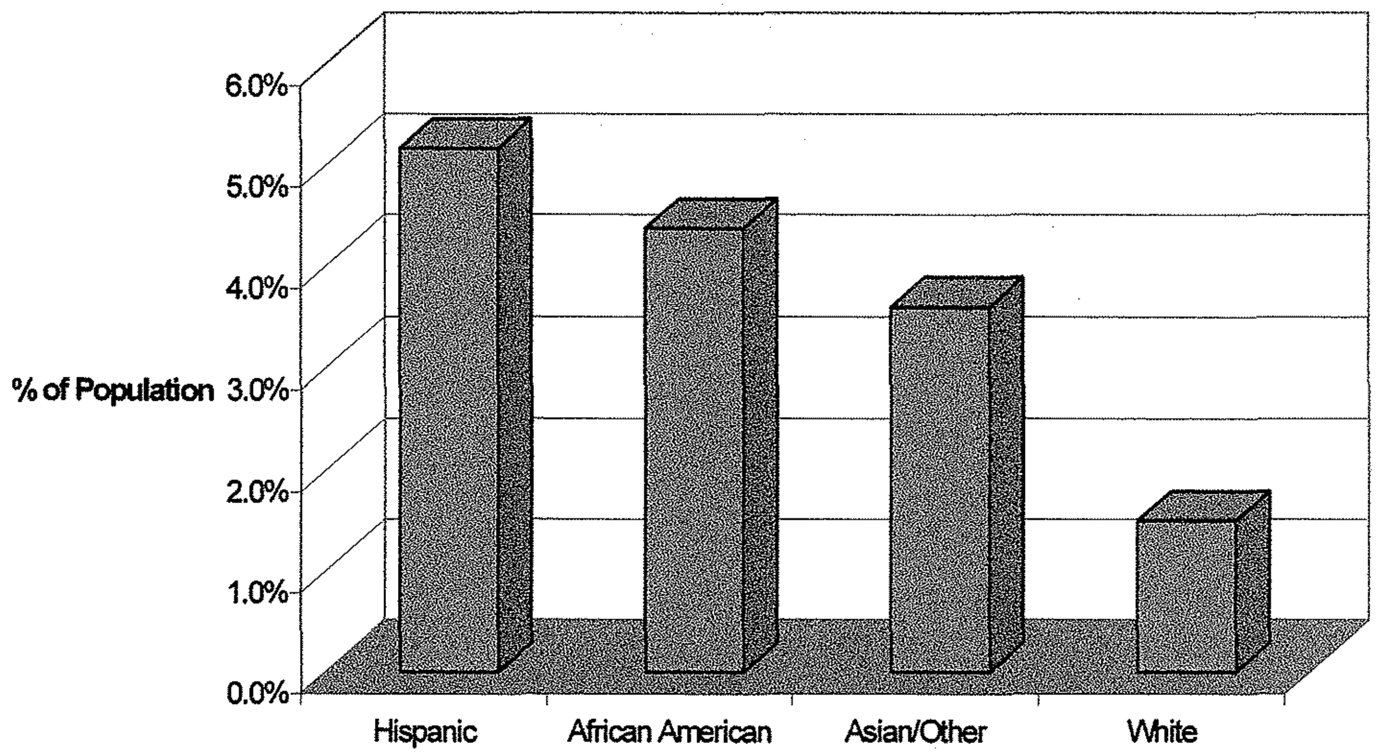
Cancer Risk for LAUSD School Children From Toxins in Air



African-American and Latino children attending Los Angeles Unified School District (LAUSD) schools bear the highest lifetime cancer risk from breathing toxic air contaminants. All categories of LAUSD school children face cancer risks from toxic air contaminants that exceed the commonly cited "acceptable" risk of 1-to-100 per million of those exposed.

Source: Morello-Frosch, R., Pastor, Jr., M., & Sadd, J., 2002, "Integrating Environmental Justice and the Precautionary Principle in Research and Policy Making: The Case of Ambient Air Toxics Exposures and Health Risks Among Schoolchildren in Los Angeles," *Annals of the American Academy of Political and Social Sciences, 584*, pp. 47-68.

Living in High Traffic Density Areas in California



Children of color in California are, on average, more than three times more likely than white children to live in high traffic density areas.

Source: Gunier, R., Hertz, A., von Behren, J., & Reynolds, P., 2003, "Traffic Density in California: Socioeconomic and Ethnic Differences Among Potentially Exposed Children," *Journal of Exposure Analysis and Environmental Epidemiology, 13*, pp. 240-246.

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Effect of exposure to traffic on lung development from 10 to 18 years of age: a cohort study

W James Gauderman, Hita Vora, Rob McConnell, Kiros Berhane, Frank Gilliland, Duncan Thomas, Fred Lurmann, Edward Avol, Nino Kunzli, Michael Jerrett, John Peters

Summary

Background Whether local exposure to major roadways adversely affects lung-function growth during the period of rapid lung development that takes place between 10 and 18 years of age is unknown. This study investigated the association between residential exposure to traffic and 8-year lung-function growth.

Methods In this prospective study, 3677 children (mean age 10 years [SD 0·44]) participated from 12 southern California communities that represent a wide range in regional air quality. Children were followed up for 8 years, with yearly lung-function measurements recorded. For each child, we identified several indicators of residential exposure to traffic from large roads. Regression analysis was used to establish whether 8-year growth in lung function was associated with local traffic exposure, and whether local traffic effects were independent of regional air quality.

Findings Children who lived within 500 m of a freeway (motorway) had substantial deficits in 8-year growth of forced expiratory volume in 1 s (FEV_1, –81 mL, p=0·01 [95% CI -143 to -18]) and maximum midexpiratory flow rate (MMEF, –127 mL/s, p=0·03 [-243 to -11]), compared with children who lived at least 1500 m from a freeway. Joint models showed that both local exposure to freeways and regional air pollution had detrimental, and independent, effects on lung-function growth. Pronounced deficits in attained lung function at age 18 years were recorded for those living within 500 m of a freeway, with mean percent-predicted 97·0% for FEV_1 (p=0·013, relative to >1500m [95% CI 94·6–99·4) and 93·4% for MMEF (p=0·006 [95% CI 89·1–97.7]).

Interpretation Local exposure to traffic on a freeway has adverse effects on children's lung development, which are independent of regional air quality, and which could result in important deficits in attained lung function in later life.

Lancet 2006; 368:

Department of Preventive Medicine, University of Southern California, 1540 Alcazar Street, Suite 220, Los Angeles, CA 90033, USA (W J Gauderman PhD, H Vora MS, Prof R McConnell MD, K Berhane PhD, Prof F Gilliland MD, Prof D Thomas PhD, E Avol MS, Prof J Peters MD); Sonoma Technology Inc., #C, Petaluma, CA 94954, USA (F Lurmann MS); Respiratory and Environmental Research Unit, Institut Municipal d'Investigació Mèdica, C. Doctor Aiguader, 80, 08003 Barcelona, Spain (N Künzli MD); and Division of Environmental Health Sciences, School of Public Health, University of California, Berkeley, CA 94720-7360, USA (M Jerrett PhD)

Correspondence to: Dr W James Gauderman jimg@usc.edu

Introduction

Both cross-sectional[1–9] and longitudinal[10–15] studies have shown that lung function in children is adversely affected by exposure to urban, regional air pollution. Evidence has emerged that local exposure to traffic is related to adverse respiratory effects in children, including increased rates of asthma and other respiratory diseases.[16–28] Cross-sectional studies in Europe have shown that deficits in lung function are related to residential exposure to traffic.[27,29–32] However, does traffic exposure have an adverse effect on lung-function development in children? The answer to this question is important in view of the extent of traffic exposure in urban environments and the established relation between diminished lung function in adulthood and morbidity and mortality.[33–39]

We investigated the association between residential exposure to traffic and 8-year lung-function development on the basis of cohort data from the Children's Health Study. We also studied the joint effects of local traffic exposure and regional air quality on children's lung development.

Methods

Participants

The Children's Health Study recruited two cohorts of fourth-grade children (mean age 10 years [SD 0·44], one in 1993 (cohort 1, n=1718) and the other in 1996 (cohort 2, n=1959). All children were recruited from schools in 12 southern California communities as part of an investigation into the long-term effects of air pollution on children's respiratory health.[7,14,40] A consistent protocol was used in all communities to identify schools, and all students targeted for study were invited to participate.[40] Overall, 82% (3677) of available students agreed to participate. Pulmonary-function data were obtained yearly by trained field technicians, who travelled to study schools to undertake maximum effort spirometry on the children, using the same equipment and testing protocol used throughout the study period. Details of the testing protocol have been previously reported.[7,15] Children in both cohorts were followed up for 8 years.

A baseline questionnaire, completed at study entry by each child's parent or legal guardian, was used to obtain information on race, Hispanic ethnic origin, parental income and education, history of doctor-diagnosed asthma, in-utero exposure to maternal smoking, and household exposure to gas stoves, pets, and environmental tobacco smoke.[40] A yearly questionnaire, with similar structure to that of the baseline questionnaire, was used to update information on asthma status, personal smoking, and exposure to environmental tobacco smoke. For statistical modelling, a three-category socioeconomic status variable was created on the basis of total household income and education of the parent or guardian that completed the questionnaire. High socioeconomic status (23% of children, n=823) was defined as a parental income greater than US$100 000 per year, or an income over US$15 000 per year and at least 4 years of college education. The middle category (36%, n=1283) included children with a parental income between US$15 000 and US$100 000 and some (less than 4 years) college or technical school education, and low socioeconomic status (41%, n=1483) included all remaining children.

The study protocol was approved by the institutional review board for human studies at the University of Southern California, and written consent was provided by a parent or legal guardian for every study participant.

Exposure Data

We characterised exposure of every study participant to traffic-related pollutants by two types of measures—proximity of the child's residence to the nearest freeway or to the nearest major non-freeway road, and model-based estimates of traffic-related air pollution at the residence, derived from dispersion models that incorporated distance to roadways, vehicle counts, vehicle emission rates, and meteorological conditions.[41] Regional air pollution was continuously monitored at one central site location within each study community over the course of the investigation. Further details of exposure assessment are available in the webappendix.

See Online for webappendix

Statistical methods

The outcome data consisted of 22 686 pulmonary-function tests recorded from 3677 participants during 8 years in both cohorts. We focused on three pulmonary-function measures: forced vital capacity (FVC), forced expiratory volume in 1 s (FEV_1), and maximum midexpiratory flow rate (MMEF, also known as FEF_{25-75}). The exposures of primary interest were the traffic measures described above.

We used a hierarchical mixed-effects model to relate 8-year growth in each lung-function measure to traffic exposure, with basic structure that has been previously described.[42] To account for the growth pattern in lung function during this period, we used a linear spline model,[43] constructed so that 8-year growth in lung function was estimated jointly with other model parameters. We estimated and tested the effect of traffic exposure on 8-year growth, and in some analyses on mean values at 10 and 18 years of age. The model allowed for separate growth curves for each sex, race, ethnic origin, cohort, and baseline-asthma subgroup. The model also included adjustments for height, height squared, body-mass index (BMI), BMI squared, present asthma status, exercise or respiratory illness on the day of the test, any tobacco smoking by the child in the previous year, and indicator variables for field technician. Random effects for the intercept and 8-year growth parameters were included at the level of participant and community.

To keep the potential effect of outliers to a minimum and to examine possible non-linear exposure-response relations, we used categorical forms of each traffic indicator in our models. For distance to the freeway, we formed four categories—less than 500 m, 500–1000 m, 1000–1500 m, and more than 1500 m. Distances to non-freeway major roads were similarly categorised based on distances of 75 m, 150 m, and 300 m. Model-based estimates of pollution from freeways and non-freeways were categorised into quartiles on the basis of their respective distributions (see webappendix). The categorisation distances for all traffic indicators were fixed before any health analyses were done. Traffic effects are reported as the difference in 8-year growth for each category relative to the least exposed category, so that negative estimates signify reduced lung-function growth or values with increased exposure.

We also considered joint estimation of traffic effects within the community and pollution between communities, which was based on the long-term average pollutant concentrations measured at the central sites (see webappendix). Pollutant effects are reported as the difference in 8-year growth in lung function from the least to the most polluted community, with negative differences indicating growth deficits with increased exposure. Possible modification of a traffic effect by community-average ambient pollutant concentration was tested by inclusion of the appropriate interaction term in the model.

To examine attained lung function, we computed percent-predicted lung function for participants who were measured in 12th grade, our last year of follow-up (n=1497, mean age 17·9 years, [SD=0·41]). To estimate predicted FEV_1 values, we first fitted a regression model for observed FEV_1 (log transformed) with predictors log height, BMI, BMI squared, sex, asthma status, race or ethnic origin, field technician, and sex-by-log height, sex-by-BMI, sex-by-BMI squared, sex-by-asthma, and sex-by-race or ethnic origin interactions. We calculated predicted FEV_1 on the basis of this model and percent-predicted as observed divided by predicted FEV_1. We used a regression model to calculate the mean percent-predicted value for each category of distance to the freeway, with adjustment for community. To aid in interpretation, we scaled percent-predicted values so that children who lived furthest (>1500 m) from a freeway had a mean of 100%, and we give means for the remaining distance groups relative to this benchmark. Analogous calculations were used to obtain the percent-predicted mean for FVC and MMEF.

Regression procedures in SAS (version 9·0) were used to fit all models. Associations denoted as significant were those with a p value less than 0·05, assuming a two-sided alternative hypothesis.

Role of the funding source

The funding sources of this study had no role in the study design, collection, analysis, or interpretation of data, in the writing of the report, or in the decision to submit the paper for publication. The corresponding

author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Results

An average of 6·2 pulmonary function tests were done per child. There were equal proportions of male and female participants (webtable 1). Most children were of non-Hispanic white or Hispanic ethnic origin. 440 (12%) children lived within 500 m of a freeway, with most of these children residing in six of the 12 communities (webtable 2 and webfigure). Model-based estimates of pollution from a freeway were skewed toward either high or low values within most study communities.

8-year growth in FVC, FEV_1, and MMEF averaged 1512 mL, 1316 mL, and 1402 mL/s, respectively, in girls, and 2808 ml, 2406 ml, and 2476 ml/s, respectively, in boys. Closer residential distance to a freeway was associated with reduced growth in lung function (table 1). In children who lived within 500 m of a freeway, 8-year growth was significantly reduced compared with those who lived at least 1500 m from a freeway. Large deficits in FEV_1 and MMEF growth were also estimated for the two highest-exposure quartiles of model-based pollution from a freeway, although neither deficit was statistically significant. Indicators of traffic from non-freeway roads, including both distance and model-based pollution estimates, were not associated with reduced growth.

The association between FEV_1 growth and distance to a freeway was significant in various sensitivity analyses (table 2). Compared with the results shown in table 1 (base model), distance-effect estimates were larger with additional adjustment for socio-economic status. Further investigation showed that low socioeconomic status was associated with increased traffic exposure, with mean residential distance to freeways of 1·8 km (SD 1·32), 2·0 km (1·65), and 2·5 km (1·91) for low, middle, and high groups respectively. However, socioeconomic status was not significantly associated with FEV_1 growth, and therefore adjustment for this variable induced only a modest change. Adjustment for indoor sources of air pollution including gas stoves, pets, and exposure to environmental tobacco smoke also resulted in little change in the estimated freeway-distance effects.

Significant distance effects were seen in the subset of children who reported never having had asthma, and in the subset of children who reported no active tobacco smoking. The relation between FEV_1 growth and distance was noticeably larger in boys than in girls, although a test of effect modification by sex was non-significant (p=0·10). Only six of the 12 communities had substantial numbers of children living within 500 m of a freeway. The estimated effects of freeway distance on lung development were more pronounced in these six higher-traffic communities than in the other communities. There was no significant evidence of heterogeneity in the local distance effects between these six communities (data not shown). Furthermore, around 34% (1267) of children moved from their baseline residence during follow-up but remained in one of the 12 study communities and thus continued to participate. If we omitted post-move lung-function measurements from the analysis, the estimated effects of freeway-distance on FEV_1 growth were more pronounced.

See Online for webtables 1 and 2 and webfigure

	FVC (mL) difference (95% CI)	FEV1 (mL) difference (95% CI)	MMEF (mL/sec) difference (95% CI)
Freeway distance*			
<500 m	−63 (−131 to 5)	−81 (−143 to −18)	−127 (−243 to −11)
500–1000 m	−31 (−93 to 32)	−41 (−99 to 17)	−35 (−142 to 73)
1000–1500 m	−19 (−84 to 46)	−33 (−93 to 26)	−94 (−204 to 16)
Model-based pollution from freeway†			
4th quartile (high)	−66 (−186 to 54)	−69 (−179 to 42)	−147 (−352 to 58)
3rd quartile	−61 (−151 to 29)	−78 (−161 to 5)	−144 (−298 to 9)
2nd quartile	−27 (−90 to 36)	−22 (−80 to 36)	−37 (−144 to 71)
Non-freeway distance‡			
<75 m	5 (−63 to 72)	−35 (−97 to 27)	−66 (−181 to 49)
75–150 m	4 (−59 to 68)	22 (−37 to 80)	35 (−74 to 144)
150–300 m	−10 (−63 to 42)	−8 (−56 to 40)	−16 (−105 to 73)
Model-based pollution from non-freeway†			
4th quartile (high)	13 (−70 to 96)	3 (−74 to 80)	2 (−140 to 144)
3rd quartile	42 (−27 to 111)	16 (−47 to 80)	−23 (−141 to 95)
2nd quartile	6 (−54 to 66)	2 (−53 to 57)	11 (−91 to 113)

*Difference in 8-year lung-function growth relative to children living at least 1500 m from a freeway. †Difference in 8-year lung-function growth relative to children in the first (lowest) quartile of exposure. ‡Difference in 8-year lung-function growth relative to children living at least 300 m from a non-freeway road.

Table 1: **Association between 8-year lung-function growth and several indicators of residential traffic exposure**

	Freeway Distance (m)					
	<500	p	500–1000	p	1000–1500	p
Base model*	−81	0·012	−41	0·165	−33	0·275
Additional covariates						
Base+socioeconomic status	−92	0·005	−50	0·092	−37	0·228
Base+gas stove in the home	−86	0·008	−42	0·160	−33	0·281
Base+pets in the home	−80	0·013	−41	0·165	−33	0·275
Base+in-utero exposure to maternal smoking	−83	0·011	−33	0·269	−36	0·245
Base+second-hand smoke exposure	−86	0·008	−41	0·163	−37	0·230
Subgroups						
Non-asthmatics only	−83	0·025	−70	0·042	−61	0·091
Non-smokers only	−99	0·006	−49	0·154	−48	0·182
Boys only	−158	0·003	−54	0·264	−77	0·123
Girls only	−12	0·750	−39	0·254	3	0·932
Six communities with closest freeway proximity†	−105	0·003	−56	0·101	−40	0·260
Deleting observations after a residence change‡	−86	0·030	−73	0·042	−53	0·148

*Base model results are the same as those in table 1. All models include adjustment for the covariates listed in the Methods section. Values are the difference in 8-year FEV_1 growth relative to those living >1500 m from a freeway. †Including only children from the six communities with the largest number of children living near a freeway (Riverside, Atascadero, Alpine, San Dimas, Long Beach, and Santa Maria). ‡Censoring any pulmonary function tests recorded after a participant left his or her baseline address.

Table 2: **Sensitivity analysis of freeway-distance effects on 8-year FEV_1 growth**

	Regional pollutant effect*	p	Local freeway distance (m)						
			<500	p	500–1000	p	1000–1500	p	p for interaction†
1000–1800 ozone	–13	0·821	–81	0·012	–41	0·165	–33	0·275	0.51
Nitrogen dioxide	–109	0·003	–80	0·012	–41	0·166	–33	0·279	0.81
Acid	–111	0·002	–80	0·013	–41	0·164	–33	0·285	0.54
PM_{10}	–111	0·013	–81	0·012	–42	0·158	–32	0·287	0.24
$PM_{2.5}$	–110	0·009	–80	0·012	–41	0·160	–33	0·285	0.40
Elemental carbon	–101	0·001	–80	0·012	–42	0·156	–33	0·282	0.63

*Pollutant effects are the difference in 8-year FEV_1 growth from lowest to highest observed community-average concentration of the pollutant, specifically: per increase of 37·5 ppb ozone (1000–1800), 34·6 ppb of nitrogen dioxide, 9·6 ppb of acid vapour, 51·4 μg/m³ of PM10, 22·8 μg/m³ of PM2.5 and 1·2 μg/m³ elemental carbon. Distance effects are the difference in 8-year growth relative to those living >1500 m from a freeway. † A test of whether freeway-distance effect is modified by regional concentration of the pollutant. PM_{10}=particulate matter <10 μm aerodynamic diameter, $PM_{2.5}$=particulate matter <2·5 μm aerodynamic diameter.

Table 3: Joint effect of regional pollution and local distance to a freeway on 8-year FEV_1 growth

Reduced lung-function growth was independently associated with both freeway distance and with regional air pollution (table 3). Statistically significant joint models of regional pollution with distance to freeway were seen for nitrogen dioxide , acid vapour, elemental carbon, and particulate matter with aerodynamic diameter less than 10 μm and less than 2·5 μm. Ozone was not associated with reduced lung-function growth. There was no significant evidence of effect modification (interaction) of local traffic effects with any of the regional pollutants.

A subset of 1445 children were observed over the full 8 years of the study, from age 10 to 18 years. In this group, we noted significant deficits in 8-year FEV_1 growth and MMEF growth for those who lived within 500 m of a freeway (table 4). At 10 years of age, there was some evidence of reduced lung function for those who lived closer to a freeway than those who did not, although none of the differences between distance categories was statistically significant. However, by 18 years of age, participants who lived closest to a freeway had substantially lower attained FEV_1 and MMEF than those who lived at least 1500 m from a freeway.

		Lung function		8-year growth
		Age 10 years	Age 18 years	Difference* (95% CI)
		Difference* (95% CI)	Difference* (95% CI)	
FVC	Freeway distance			
	<500 m	–17 (–70 to 37)	–85 (–192 to 22)	–69 (–160 to 22)
	500–1,000 m	–12 (–61 to 37)	–54 (–151 to 43)	–42 (–125 to 41)
	1000–1500 m	–30 (–80 to 21)	–81 (–181 to 19)	–52 (–137 to 33)
FEV_1	Freeway distance			
	<500 m	–23 (–73 to 28)	–121 (–219 to –23)	–98 (–182 to –15)
	500–1000 m	–32 (–78 to 14)	–93 (–183 to –4)	–61 (–137 to 15)
	1000–1500 m	–34 (–81 to 14)	–78 (–170 to 14)	–44 (–122 to 34)
MMEF	Freeway distance			
	<500 m	–57 (–169 to 56)	–230 (–432 to –28)	–173 (–327 to –19)
	500–1000 m	–92 (–195 to 10)	–105 (–289 to 79)	–12 (–152 to 128)
	1000–1500 m	–45 (–150 to 60)	–151 (–340 to 38)	–106 (–250 to 38)

*Difference in 8-year lung function or growth relative to children living >1500 m from a freeway.

Table 4: Cumulative effect of residential distance in the 1445 children with full 8-year of follow-up

These deficits in average FEV_1 and MMEF translated into pronounced deficits in percent-predicted lung function at 18 years of age (figure). There was a trend of lower percent-predicted lung function for children who lived closer to a freeway than for those who lived further away. The effect was most pronounced for those who lived less than 500 m from a freeway, with average percent predicted values of 97·0% (95% CI 94·6–99·4) for FEV_1 (p=0·013 relative to >1500 m) and 93·4% (89·1–97·7) for MMEF (p=0·006).

Discussion

This study shows that residential proximity to freeway traffic is associated with substantial deficits in lung-function development in children. 8-year increases in both FEV_1 and MMEF were smaller for children who lived within 500 m of a freeway, than for those who lived at least 1500 m from a freeway. Freeway effects were seen in subsets of non-asthmatic and non-smoking participants, which is an indication that traffic exposure has adverse effects on otherwise healthy children. Deficits in 8-year growth resulted in lower attained FEV_1 and MMEF at 18 years of age for participants who lived within 500 m of a freeway than for those who lived further away. Since lung development is nearly complete by age 18 years, an individual with a deficit at this time will probably continue to have less than healthy lung function for the remainder of his or her life.

We previously reported an association between community-average pollutant concentrations and 8-year lung-function growth.[15] That result relied on comparisons in communities that had different concentrations of regional air pollution, and implicated many pollutants such as nitrogen dioxide, acid vapour, particulate matter with aerodynamic diameter less than 10 μm and 2·5 μm, and elemental carbon. Our present study builds on that result, and shows that in addition to regional pollution, local exposure to large roadways are associated with diminished lung-function development in children. We did not find any evidence that traffic effects varied depending on background air quality, which suggests that even in an area with low regional pollution, children living near a major roadway are at increased risk of health effects. Our results also suggest that children who live close to a freeway in a high pollution area experience a combination of adverse developmental effects because of both local and regional pollution.

We noted a larger freeway effect in boys than in girls, although the difference between sexes was not significant. By contrast, a cross-sectional European study[29] reported larger traffic effects on lung function in girls than in boys.[29] Several factors could explain this discrepancy in sex-specific effects between studies, from differences in specific air pollution mixtures and underlying population susceptibilities, to the general difficulty of comparisons between longitudinal and cross-sectional study effect estimates. In general, however, both studies show that lung function in children is adversely affected by exposure to traffic.

The concentrations of several pollutants are raised near major freeways. Daytime concentrations of black carbon, ultrafine particulate, and other exhaust pollutants have been reported to be high, but decline exponentially, within 500 m of a freeway,[44,45] although night-time concentrations of ultrafine particulate remain above background concentrations for distances greater than 500 m from a freeway.[46] Some studies have reported increased traffic pollution, particularly nitrogen dioxide, at distances over 1000 m from a freeway.[16,47–49] Elemental carbon, an indicator of pollution from diesel exhaust, varies with nearby high-traffic roads[47,50,51] but can also be transported across large distances.[52] Diesel exhaust is one of the primary contributors to particulate-matter concentrations in those communities most affected by traffic.[53] A pollutant such as elemental carbon could explain our reported health effects both locally and regionally.

Both regional ambient and ultrafine particulate matter present in high concentration in close proximity to roadways can elicit oxidative and nitrosative stress in the airways, which results in inflammation.[54,55] Kulkarni and co-workers[32] reported that traffic-related particulate matter was correlated with the amount of carbon in the airway macrophages of children, which in turn was associated with reductions in FEV_1, MMEF, and FVC. Chronic airway inflammation could produce our reported deficits in increased MMEF and FEV_1. Additional research is needed to identify the specific traffic pollutants that bring about health effects, and to elucidate the contribution of each pollutant to regional and local associations.

A strength of this study was the long-term, prospective follow-up of two large cohorts of children, with exposure and outcome data obtained consistently. However, as in any epidemiological study, our results could be confounded by one or more other factors related to both traffic and lung-function growth. Our results were robust to adjustment for several factors, including socioeconomic status and indoor sources of air pollution, but the possibility of confounding by other factors still exists. Throughout the 8-year follow-up, we noted around an 11% loss of study participants per year. Participant attrition is a potential source of bias in cohort studies. We analysed the subset of children who were followed up for the full 8-year duration of the study and also noted significant traffic-effect estimates, which make participant loss an unlikely explanation for our results. We did not note a significant association between growth and model-based pollution from a freeway, despite large estimated deficits in the highest-exposure quartiles (table 1). However, we were restricted in detection of an association with model-based pollution from freeways because there was little variation in this measure within most of our study communities (webtable 2).

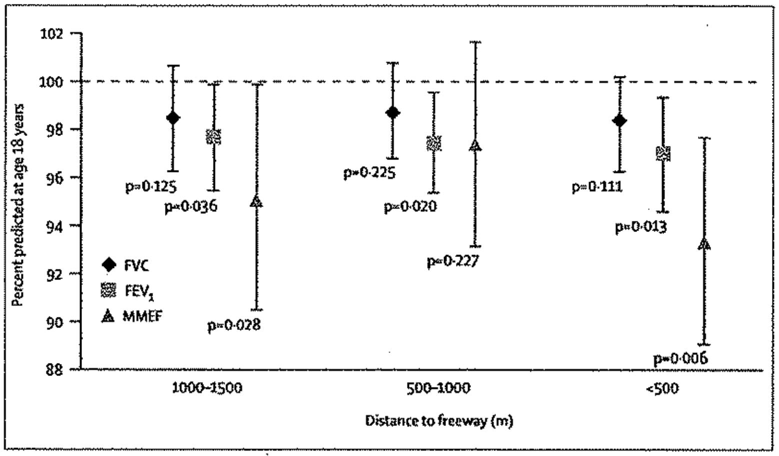

Figure: Percent-predicted lung function at age 18 years versus residential distance from a freeway
The horizontal line at 100% corresponds to the referent group, children living >1500 m from a freeway.

We have shown that residential distance from a freeway is associated with significant deficits in 8-year respiratory growth, which result in important deficits in lung function at age 18 years. This study adds to evidence that the present regulatory emphasis on regional air quality might need to be modified to include consideration of local variation in air pollution. In many urban areas, population growth is forcing the construction of housing tracts and schools near to busy roadways, with the result that many children live and attend school in close proximity to major sources of air pollution. In view of the magnitude of the reported effects and the importance of lung function as a determinant of adult morbidity and mortality, reduction of exposure to traffic-related air pollutants could lead to substantial public-health benefits.

Contributors

W J Gauderman, R McConnell, F Gilliland, E Avol, J Peters, M Jerrett and N Kunzil participated in the writing of the manuscript. W J Gauderman, H Vora, K Berhane, D Thomas, and F Lurmann participated in the analysis of the data. All named authors took part in the interpretation of results, and approved the final version of the manuscript.

Conflict of interest statement
We declare that we have no conflict of interest.

Acknowledgments
This study was supported in part by the California Air Resources Board (contract A033-186), the National Institute of Environmental Health Sciences (P01ES11627 and P30ES07048), and the Hastings Foundation. We thank Cheryl Faucett for helpful discussions, members of our external advisory committee (Jonathan Samet, Nan Laird, Steve Rich, Petros Koutrakis, Gerhardt Coetzee) for important input, the school principals, teachers, students, and parents in each of the 12 study communities for their cooperation and the health testing field team.

References

1 Ware J, Ferris BJ, Dockery D, Spengler J, Stram D, Speizer F. Effects of ambient sulfur oxides and suspended particles on respiratory health of preadolescent children. *Am Rev Respir Dis* 1986; 133: 834–42.

2 Dockery D, Speizer F, Stram D, Ware J, Spengler J, Ferris BJ. Effects of inhalable particles on respiratory health of children. *Am Rev Respir Dis* 1989; 139: 587–94.

3 Schwartz J. Lung function and chronic exposure to air pollution: a cross-sectional analysis of NHANES II. *Environ Res* 1989; 50: 309–21.

4 Raizenne M, Neas L, Damokosh A, et al. Health effects of acid aerosols on North American children: pulmonary function. *Am Rev Respir Dis* 1993; 147: A635.

5 Bascom R, Bromberg P, Costa D, et al. State of the art: health effects of outdoor air pollution, part 1. *Am J Respir Crit Care Med* 1996; 153: 3-50.

6 Bascom R, Bromberg P, Costa D, et al. State of the art: health effects of outdoor air pollution, part 2. *Am J Respir Crit Care Med* 1996; 153: 477–98.

7 Peters J, Avol E, Gauderman W, et al. A study of twelve southern California communities with differing levels and types of air pollution II. Effects on pulmonary function. *Am J Respir Crit Care Med* 1999; 159: 768–75.

8 Kunzli N, Lurmann F, Segal M, Ngo L, Balmes J, Tager IB. Association between lifetime ambient ozone exposure and pulmonary function in college freshmen—results of a pilot study. *Environ Res* 1997; 72: 8–23.

9 Tager IB, Balmes J, Lurmann F, Ngo L, Alcorn S, Kunzli N. Chronic exposure to ambient ozone and lung function in young adults. *Epidemiology* 2005; 16: 751–59.

10 Frischer T, Studnicka M, Gartner C, et al. Lung function growth and ambient ozone: a three-year population study in school children. *Am J Respir Crit Care Med* 1999; 160: 390–96.

11 Jedrychowski W, Flak E, Mroz E. The adverse effect of low levels of ambient air pollutants on lung function growth in preadolescent children. *Environ Health Perspect* 1999; 107: 669–74.

12 Horak FJ, Studnicka M, Gartner C, et al. Particulate matter and lung function growth in children: a 3-yr follow-up study in Austrian schoolchildren. *Eur Respir J* 2002; 19: 838–45.

13 Gauderman W, McConnell R, Gilliland F, et al. Association between air pollution and lung function growth in southern California children. *Am J Respir Crit Care Med* 2000; 162: 1383–90.

14 Gauderman W, Gilliland F, Vora H, et al. Association between air pollution and lung function growth in southern California children: results from a second cohort. *Am J Respir Crit Care Med* 2002; 166: 76–84.

15 Gauderman W, Avol E, Gilliland F, et al. The effect of air pollution on lung development from 10 to 18 years of age. *N Engl J Med* 2004; 351: 1057–67.

16 Gauderman W, Avol E, Lurmann F, et al. Childhood asthma and exposure to traffic and nitrogen dioxide. *Epidemiology* 2005; 16: 737–43.

17 Nicolai T, Carr D, Weiland SK, et al. Urban traffic and pollutant exposure related to respiratory outcomes and atopy in a large sample of children. *Eur Respir J* 2003; 21: 956–63.

18 Venn A, Lewis S, Cooper M, et al. Local road traffic activity and the prevalence, severity, and persistence of wheeze in school children: combined cross sectional and longitudinal study. *Occup Environ Med* 2000; 57: 152–58.

19 Venn AJ, Lewis SA, Cooper M, Hubbard R, Britton J. Living near a main road and the risk of wheezing illness in children. *Am J Respir Crit Care Med* 2001; 164: 2177–80.

20 van Vliet P, Knape M, de Hartog J, Janssen N, Harssema H, Brunekreef B. Motor vehicle exhaust and chronic respiratory symptoms in children living near freeways. *Environ Res* 1997; 74: 122–32.

21 Hirsch T, Weiland SK, von Mutius E, et al. Inner city air pollution and respiratory health and atopy in children. *Eur Respir J* 1999; 14: 669–77.

22 Edwards J, Walters S, Griffiths RK. Hospital admissions for asthma in preschool children: relationship to major roads in Birmingham, United Kingdom. *Arch Environ Health* 1994; 49: 223–27.

23 Kim J, Smorodinsky S, Lipsett M, Singer BC, Hodgson AT, Ostro B. Traffic-related air pollution near busy roads: the East Bay Children's Respiratory Health Study. *Am J Respir Crit Care Med* 2004; 170: 520–26.

24 Brauer M, Hoek G, Van Vliet P, et al. Air pollution from traffic and the development of respiratory infections and asthmatic and allergic symptoms in children. *Am J Respir Crit Care Med* 2002; 166: 1092–98.

25 Zmirou D, Gauvin S, Pin I, et al. Traffic related air pollution and incidence of childhood asthma: results of the Vesta case-control study. *J Epidemiol Community Health* 2004; 58: 18–23.

26 Delfino RJ. Epidemiologic evidence for asthma and exposure to air toxics: linkages between occupational, indoor, and community air pollution research. *Environ Health Perspect* 2002; 110 (suppl 4): 573–89.

27 Janssen NA, Brunekreef B, van Vliet P, et al. The relationship between air pollution from heavy traffic and allergic sensitization, bronchial hyperresponsiveness, and respiratory symptoms in Dutch schoolchildren. *Environ Health Perspect* 2003; 111: 1512–18.

28 McConnell R, Berhane K, Yao L, et al. Traffic, susceptibility, and childhood asthma. *Env Health Perspect* 2006; 114: 766–72.

29 Brunekreef B, Janssen N, de Hartog J, Harssema H, Knape M, van Vliet P. Air pollution from truck traffic and lung function in children living near motorways. *Am J Epidemiol* 1997; 8: 298–303.

30 Wjst M, Reitmeir P, Dold S, et al. Road traffic and adverse effects on respiratory health in children. *BMJ* 1993; 307: 596-600.

31 Sugiri D, Ranft U, Schikowski T, Kramer U. The influence of large-scale airborne particle decline and traffic-related exposure on children's lung function. *Environ Health Perspect* 2006; 114: 282–88.

32 Kulkarni N, Pierse N, Rushton L, Grigg J. Carbon in airway macrophages and lung function in children. *N Engl J Med* 2006; 355: 21–30.

33 Hole D, Watt G, Davey Smith G, et al. Impaired lung function and mortality risk in men and women: findings from the Renfrow and Paisley prospective population study. *BMJ* 1996; 313: 711–15.

34 Knuiman M, James A, Davitini M, et al. Lung function, respiratory symptoms, and mortality: results from the Busselton Health Study. *Ann Epidemiol* 1999; 9: 297–306.

35 Schunemann H, Dorn J, Grant B, et al. Pulmonary function is a long-term predictor of mortality in the general population: 29-year follow-up of the Buffalo Health Study. *Chest* 2000; 118: 656–64.

36 Schroeder E, Welch V, Couper D, et al. Lung function and incident coronary heart disease, the Atherosclerosis Risk in Communities Study. *Am J Epidemiol* 2003; 158: 1171–81.

37 Friedman G, Klatsky A, Siegelaub A, et al. Lung function and risk of myocardial infarction and sudden cardiac death. *N Engl J Med* 1976; 294: 1071–75.

38 Kannell W, Hubert H, Lew E, Jones J. Vital capacity as a predictor of cardiovascular disease: the Framingham Study. *Am Heart J* 1983; 105: 311–15.

39 Ashley F, Kannell W, Sorlie P, et al. Pulmonary function: relation to aging, cigarette habit, and mortality. The Framingham Study. *Ann Intern Med* 1975; 82: 739–45.

40 Peters J, Avol E, Navidi W, et al. A study of twelve southern California communities with differing levels and types of air pollution I. Prevalence of respiratory morbidity. *Am J Respir Crit Care Med* 1999; 159: 760–67.

41 Bensen P. CALINE4—A dispersion model for predicting air pollution concentrations near roadways. Sacramento: California Department of Transportation, 1989.

42 Berhane K, Gauderman W, Stram D, Thomas D. Statistical issues in studies of the long term effects of air pollution: the southern California Children's Health Study (with discussion). *Stat Sci* 2005; 19: 414–49.

43 Wang X, Dockery D, Wypij D, et al. Pulmonary function growth velocity in children 6 to 18 years of age. *Am Rev Respir Dis* 1993; **148:** 1502–08.

44 Zhu Y, Hinds WC, Kim S, Sioutas C. Concentration and size distribution of ultrafine particles near a major highway. *J Air Waste Manag Assoc* 2002; **52:** 1032–42.

45 Gilbert NL, Woodhouse S, Stieb DM, Brook JR. Ambient nitrogen dioxide and distance from a major highway. *Sci Total Environ* 2003; **312:** 43-46.

46 Zhu Y, Kuhn T, Mayo P, Hinds WC. Comparison of daytime and nighttime concentration profiles and size distributions of ultrafine particles near a major highway. *Environ Sci Technol* 2006; **40:** 2531–36.

47 Brauer M, Hoek G, van Vliet P, et al. Estimating long-term average particulate air pollution concentrations: application of traffic indicators and geographic information systems. *Epidemiology* 2003; **14:** 228–39.

48 Gilbert NL, Goldberg MS, Beckerman B, Brook JR, Jerrett M. Assessing spatial variability of ambien nitrogen dioxide in Montreal, Canada, with a land-use regression model. *J Air Waste Manag Assoc* 2005; **55:** 1059–63.

49 Gonzales M, Qualls C, Hudgens E, Neas L. Characterization of a spatial gradient of nitrogen dioxide across a United States-Mexico border city during winter. *Sci Total Environ* 2005; **337:** 163–73.

50 Fischer PH, Hoek G, Van Reeuwijka H, et al. Traffic-related differences in outdoor and indoor concentrations of particles and volatile organic compounds in Amsterdam. *Atmos Environ* 2000; **34:** 3713–22.

51 Roorda-Knape MC, Janssen NAH, de Hartog JJ, Van Vliet PHN, Harssema H, Brunekreef B. Air pollution from traffic in city districtc near major motorways. *Atmos Environ* 1998; **32:** 1921–30.

52 Khan A, Li J, Husain L. Atmospheric transport of elemental carbon. *J Geophys Res* 2006; **111:** D04303.

53 Manchester-Neesvig J, Schauer J, Cass G. The distribution of particle-phase organic compounds in the atmosphere and their use for source apportionment during the southern California Children's Health Study. *J Air Waste Manag Assoc* 2003; **53:** 1065–79.

54 Li N, Hao M, Phalen RF, Hinds WC, Nel AE. Particulate air pollutants and asthma. A paradigm for the role of oxidative stress in PM-induced adverse health effects. *Clin Immunol* 2003; **109:** 250–65.

55 Nel A. Atmosphere. Air pollution-related illness: effects of particles. *Science* 2005; **308:** 804–06.

Effect of exposure to traffic on lung development from 10 to 18 years of age: a cohort study

Correspondence to:
Dr W James Gauderman
jimg@usc.edu

	n	Mean number of PTFs	Children with 8-years' follow-up		Female (%)	Asthma (%)	Race/Ethnic origin (%)				
			n	(%)			NHW	HW	AA	Asian	Other
Riverside	329	6·0	123	37·4	50·5	14·6	36·5	42·0	12·5	2·4	6·7
Atascadero	278	6·8	117	42·1	48·9	22·3	75·2	14·8	1·1	1·1	7·9
Alpine	308	6·2	121	39·3	50·1	12·9	75·0	18·8	0·0	0·3	5·8
Long Beach	320	6·1	141	44·1	47·5	13·9	32·2	24·7	18·4	15·3	9·4
San Dimas	293	6·4	117	39·9	50·2	15·3	50·2	32·4	3·1	9·2	5·1
Santa Maria	310	5·7	100	32·3	49·4	14·6	25·2	62·9	1·0	4·5	6·5
Lake Elsinore	306	6·0	104	34·0	50·0	12·5	64·3	25·8	2·3	2·0	5·6
Mira Loma	319	5·9	118	37·0	50·2	12·3	51·7	42·3	1·6	0·9	3·5
Upland	283	6·9	150	53·0	52·7	13·7	66·4	17·3	4·3	8·5	3·5
Lancaster	315	5·5	110	34·9	52·1	14·7	52·1	29·8	9·2	2·2	6·7
Lompoc	281	6·3	113	40·2	47·0	10·3	55·2	28·1	5·7	5·3	5·7
Lake Arrowhead	335	6·2	131	39·1	51·3	14·6	73·1	20·0	0·3	0·9	5·7
Overall	3677	6·2	1445	39·3	49·9	14·3	54·4	30·2	5·0	4·4	6·0

NHW=Non-Hispanic whites. HW=Hispanic whites. AA=African American. PFT=pulmonary-function test.

Webtable 1: **Participants' characteristics by community**

Effect of exposure to traffic on lung development from 10 to 18 years of age: a cohort study

	n	Residential distance to dearest								Model-based pollution from							
		Freeway (m)				Major non-freeway road (m)				Freeways (quartile*)				Major non-freeway roads (quartile*)			
		<500	500–1000	1000–1500	>1500	<75	75–150	150–300	>300	4th	3rd	2nd	1st	4th	3rd	2nd	1st
Riverside	329	103	66	61	99	46	45	90	148	190	123	14	2	149	138	41	1
Atascadero	278	83	60	46	89	11	8	15	244	0	70	155	53	4	17	58	199
Alpine	308	81	54	42	131	41	9	31	227	14	135	141	18	21	43	73	171
Long Beach	320	54	64	54	148	55	79	78	108	264	54	2	0	311	9	0	0
San Dimas	293	47	145	83	18	45	47	62	139	282	8	1	2	169	114	9	1
Santa Maria	310	44	74	58	134	25	47	104	134	0	7	73	230	18	191	64	37
Lake Elsinore	306	12	17	7	270	32	33	50	191	1	41	184	80	17	27	103	159
Mira Loma	319	9	30	45	235	20	37	57	205	11	304	2	2	12	43	212	52
Upland	283	4	0	0	279	53	52	62	116	4	2	85	192	83	100	60	40
Lancaster	315	3	35	31	246	52	24	91	148	0	21	108	186	48	127	128	12
Lompoc	281	0	0	0	281	5	21	33	222	..	..	..	..	4	26	88	163
Lake Arrowhead	335	0	0	0	335	0	0	0	335	..	..	..	..	..	..	..	..
Total	3677	440	545	427	2265	385	402	673	2217	766	765	765	765	836	835	836	835

*There is no major freeway within Lompoc or Lake Arrowhead, and no major non-freeway road within Lake Arrowhead.

Webtable 2: Number of study participants within categories of four traffic indicators

Correspondence to:
Dr W James Gauderman
jimg@usc.edu

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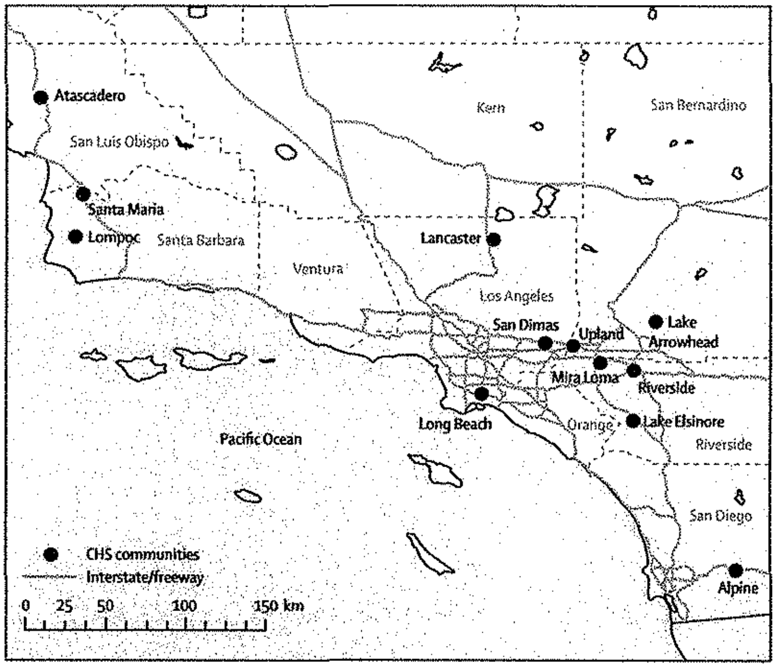
Correspondence to:
Dr W James Gauderman
jimg@usc.edu



Webfigure: Location of the 12 Children's Health Study communities and the major freeways (purple lines) in southern California.

Effect of exposure to traffic on lung development from 10 to 18 years of age: a cohort study

Correspondence to:
Dr W James Gauderman
jimg@usc.edu

Details of exposure assessment

Traffic exposures were assigned to each child on the basis of the residence at study entry. Residence addresses were standardised and their locations geocoded by use of the TeleAtlas database and software (Tele Atlas Inc., Menlo Park, CA, www.na.teleatlas.com). We used ERSI ArcGIS version 8.3 (ESRI, Redland, CA www.esri.com) software to calculate the distance from each residence to the nearest freeway, defined as an interstate freeway, US highway, or restricted-access highway, and to the nearest major non-freeway road, which included other types of highways and large roads. Yearly average daily traffic volumes were obtained from the California Department of Transportation Highway Performance Monitoring System for the year 2000. To obtain model-based estimates of traffic-related pollution exposure, we used the CALINE4 line-source air-quality dispersion model, separately for freeways and non-freeway roads.[1] The main model inputs included roadway geometry, traffic volumes, meteorological conditions (wind speed and direction, atmospheric stability, and mixing heights), and vehicle emission rates. We used the CALINE4 model to predict nitrogen dioxide concentrations derived from freeways and non-freeways at each child's home. Categories of exposure were then formed on the basis of quartiles of the within-community distribution of child-specific predictions, specifically based on cutpoints 0·6, 1·9, and 7·1 parts per billion (ppb) from freeways, and 1·5, 2·6, and 5·3 ppb from non-freeway roads. We also used the CALINE4 model to predict concentrations of other traffic-related pollutants, including oxides of nitrogen, elemental carbon, and carbon monoxide. However, predictions for each of these pollutants were almost perfectly correlated (around 0·99) with predictions of nitrogen dioxide. Thus, our model-based concentrations should be viewed as general measures of traffic-related pollution rather than this pollutant specifically. For both distance and model-based traffic indicators, within-community deviations from the corresponding community mean of the indicator were used in the health models to assess local (rather than between-community) effects.

Air-pollution monitoring stations were established in each of the 12 study communities and provided continuous monitoring data from 1994 to 2003. Each station measured average hourly concentrations of ozone, nitrogen dioxide, and particulate matter with aerodynamic diameter less than 10 μm (PM_{10}). Stations also collected 2-week integrated filter samples for measuring acid vapour and $PM_{2.5}$ mass and chemistry. Acid vapour included both inorganic (nitric, hydrochloric) and organic (formic, acetic) acids. For statistical analysis, we used total acid calculated as the sum of nitric, formic, and acetic acid concentrations. Hydrochloric acid was excluded from this sum, because concentrations were very low and close to the detection limit. In addition to measurement of $PM_{2.5}$ mass, we measured concentrations of elemental carbon and organic carbon, using the NIOSH 5040 method.[2] We calculated yearly averages on the basis of 24 h (PM_{10}, nitrogen dioxide) or 2-week ($PM_{2.5}$, elemental carbon, organic carbon, acid) average concentrations. For ozone, we calculated the yearly average of the 1000–1800 h (8 h daytime) average. Long-term mean pollutant concentrations (between 1994 and 2000 for cohort 1 and 1996 and 2003 for cohort 2) were also calculated for use in the statistical analysis of the lung-function outcomes. The distribution and correlation structure of these pollutants across communities, and their effect on lung function development, have been previously reported.[3-5] In this paper, we used community-average pollutant concentrations in models of local traffic exposure to investigate their combined effects and to explore the possibility that traffic effects vary according to regional air quality.

References

1. Bensen P. CALINE4—A dispersion model for predicting air pollution concentrations near roadways. Sacramento: California Department of Transportation, 1989.
2. NIOSH Method 5040 Issue 3 (Interim): Elemental Carbon (Diesel Exhaust). In NIOSH Manual of Analytical Methods. Cincinnati, Ohio: National Institute of Occupational Safety and Health, 1999.
3. Gauderman W, McConnell R, Gilliland F, et al. Association between air pollution and lung function growth in southern California children. *Am J Respir Crit Care Med* 2000; 162: 1383–90.
4. Gauderman W, Gilliland F, Vora H, et al. Association between air pollution and lung function growth in southern California children: results from a second cohort. *Am J Respir Crit Care Med* 2002; 166: 76–84.
5. Gauderman W, Avol E, Gilliland F, et al. The effect of air pollution on lung development from 10 to 18 years of age. *N Engl J Med* 2004; 351: 1057–67.

Item 11

Diane Edwardson

2630 Corralitas Drive, Los Angeles, CA 90039
phone: (323) 666-1392, cell: (213) 910-9826
diane.edwardson@earthlink.net

City Councilmember Reyes
200 N. Spring St.
Los Angeles, CA 90012

Re: CF 09-0082 in PLUM April 28, 2009
ENV 2005-9337-MND-REC
VTT 62900-SL-2A
APCE 2006-8787-ZC
2400 Allesandro St., 2005 & 2021 W. El Moran St.

Date: 5-12-09
Submitted in PLUM Committee
Council File No: 09-0082
Item No.: 11
Deputy: B. Graves

April 20, 2009

Councilmember Reyes,

I urge you to reconsider our appeal and deny the approval of VTT 62900-SL. The updated MND is flawed and requires additional mitigations. Please see attached for further discussion for impacts of grading, tree loss and wildlife.

There is no public benefit to this plan as we will have to endure years of grading and construction and permanent loss of significant trees just to increase the density on the site.

Should you choose to allow this development proposal to move forward I would strongly urge you to add the following mitigations.

Since this property is less than 100' from the 2 Freeway, a major commuter route, the **mitigations for tree loss are inadequate and should exceed City Standards**. The City Planning Commission has been working on new standards for residential construction near freeways which include emphasis on planting and preserving lots of trees. This plan does the bare minimum which will not mitigate for the loss of significant and native trees.

No approvals should be granted until the uppermost slope between proposed Lot 16, El Moran, Peru & Modjeska Streets is evaluated for retention and drainage measures. See attached pages 3 - 6 for detail. And it should require additional environmental review if it requires the removal of the significant and native trees in the slope. The developer maintained trees in that portion of the slope would remain – the only trees that would remain in the entire 3 acres – so this is of extreme importance that it be vetted properly.

No evaluation of the trees in the street rights-of-way of Alvarado, El Moran, Modjeska Peru has occurred.

Nor has any discussion about the removal of Modjeska from future use as requested by the developer. His plan shows cutting into the Modjeska St right-of-way with drainage devices. There are 7 landlocked lots on this public right of way that could be built with a public staircase. **No trees shall be removed prior to the granting of Grading Permits by Dept. of Building & Safety.** The legacy of failed development in this area is decades long. We do not want to be left with a denuded and unsafe slope with unfinished retaining walls when a developer runs out of money.

The MND and biological resource report is boilerplate and inadequate for short and long term mitigations. Attached is evidence and discussion of local wildlife within 500' to 1000' radius of the proposed development.

The biological report FAILS to recognize what is a very well accepted fact that freeway underpasses are urban wildlife corridors. Since the Rosebud underpass only connects to one street, Corralitas Drive, it is not a busy underpass. Wildlife frequently use it, even in the daytime, once the commute hours are over. See attached study by Ng, Dole, 2004: "Use of Highway Undercrossings by Wildlife in Southern California."

The dense brush on the Semi Tropic Spiritualists' Tract lots in question absolutely provide habitat for urban wildlife beyond what CAJA pulled off a list in a computer. Remarkably, we documented Gray Fox sightings in 2008 within 600' of the proposed development. In more than 30 years, neighbors had never seen a fox in the neighborhood. Clearly they hide well in the dense brush as evidenced by the den activity on the attached photos.

Special attention to fencing, as suggested by the SMMC in February 2009, such as no taller than 4-foot, 3-post rail fencing should be REQUIRED on Lot 16, as well as the lower portion of the property on Allesandro (say, within the CalTrans easement) to provide adequate cover for wildlife using the Rosebud Undercrossing. Native trees and landscaping should also be required in these areas. Similar fencing is in use on Glendale Blvd near Fletcher intersection for the newly constructed BUILT houses on Ivanhoe.

The MND fails to recognize the lots in question are within the Rim of the Valley Trail Corridor. While the City placed an equestrian trail in the Community Plan map on a nearby street, also within the Rim of the Valley Corridor, the corridor is much larger than a 12'-wide horse trail. The trail corridor implies native habitat protections. I am severely disappointed in the City's refusal to recognize and preserve exceptional habitat that would link to Elysian Park (about 300' away, via Modjeska).

Our community is so divided and impacted by freeways that we absolutely need to go beyond the standard mitigations for areas not only near freeways, but also within the Rim of the Valley Trail Corridor.

Throughout the process CD13 supported the community's wish to have accessible and functional open space. This plan includes neither.

I urge you to grant the appeal and deny the application for the zone change and subdivision. The complete rape of the hillside just to build 15 homes is not worth the price.

Sincerely,

Diane Edwardson

09-0082

From: Joyce Dillard <dillardjoyce@yahoo.com>
To: Barbara Greaves <barbara.greaves@lacity.org>
CC: Diane Edwardson <diane.edwardson@earthlink.net>
Date: 5/12/2009 1:25 PM
Subject: Comments to Planning Land Use Committee, Agenda No. 11, CFI 09-0082, APCE 2006-8787-ZC and VTT 62900-SL-2A

A full Environmental Impact Report is necessary.

This development is not integrated with:

Housing Element
Urban Form and Neighborhood Design
Open Space and Conservation
Economic Development
Transportation
Infrastructure and Public Services

Reports are old, some as much as a decade or two.

Will there be sufficient water supply for the City or will citizens be expected to ration due to drought conditions with the approval of this case. There is no indication of planning for the "20x2020" Water Conservation Plan.

Structural BMP Prioritization and Analysis Tool been has not been utilized.

Absent is Integrated Regional Water Management Planning.

The Applicant is shown as Henry Nunez, Henry Nunez Real Estate Co. Inc.

Victor Griego was a partner in this development. Mr. Griego has a contract with the City of Los Angeles under the company Diverse Strategies for Organizing.

Mr. Nunez has a contract with Los Angeles Unified School District of which the Mayor has a Memorandum of Agreement under Partnership for Los Angeles Schools.

Conflicts of interest need to be disclosed.

Joyce Dillard
P.O. Box 31377
Los Angeles, CA 90031