APPENDIX I. CALCULATION OF ANTI-POVERTY SUBSIDY COSTS

Federal Earned Income Tax Credit (EITC) Program

The amount of the EITC is set by the IRS depending on income and family size. We used the eligibility table on the web site of the Center for Budget Policy and Priorities, based in Washington D.C., to look up the amount of the credit. http://www.cbpp.org/eic2000/benefits.pdf

California Healthy Families Program

The cost per child was calculated by dividing the amount of the 1999-2000 program budget ($224.5 million) by the annual caseload (279,000 children).

L.A. County Indigent Health Care

The cost per indigent patient was calculated by estimating the amount of county funding for health services for indigent patients and dividing it by the estimated number of indigent patients served in that year. The county keeps records on the number of indigent adult patients (249,215, or 45% of all adult patients, in 1997, the most recent year information is available.) The county does not keep records on indigent children patients. We estimated this figure by applying the percentage of adult patients who are indigent (45%) to the total number of children (114,872 in 1996-97, the most recent year available.) We then added the adult and children indigent totals to derive an indigent patient total of 345,907. To estimate the cost to the county of serving indigent patients, we applied the percentage of patients who are indigent (45%) to the total amount of county funding for health services operations in 1999-2000 ($345 million). These calculations are likely to underestimate the cost to the taxpayer of serving indigent patients, because they do not include state or federal funding for the county public health system.

Section 8

The housing voucher is based on Fair Market Rents set by the U.S. Department of Housing and Urban Development. The amount of the voucher is the difference between the Fair Market Rent and 30% of family income.

Federal School Meals Program

Air Pollution and Bronchitic Symptoms in Southern California Children with Asthma

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The association of air pollution with the prevalence of chronic lower respiratory tract symptoms among children with a history of asthma or related symptoms was examined in a cross-sectional study. Parents of a total of 3,676 fourth, seventh, and tenth graders from classrooms in 12 communities in Southern California completed questionnaires that characterized the children's histories of respiratory illness and associated risk factors. The prevalences of bronchitis, chronic phlegm, and chronic cough were investigated among children with a history of asthma, wheeze without diagnosed asthma, and neither wheeze nor asthma. Average ambient annual exposure to ozone, particulate matter (PM_{10} and $PM_{2.5}$; ≤ 10 μm and < 2.5 μm in aerodynamic diameter, respectively), acid vapor, and nitrogen dioxide (NO_2) was estimated from monitoring stations in each community. Positive associations between air pollution and bronchitis and phlegm were observed only among children with asthma. As PM_{10} increased across communities, there was a corresponding increase in the risk per interquartile range of bronchitis [odds ratio (OR) 1.4/19 μg/m^3; 95% confidence interval (CI), 1.1–1.8). Increased prevalence of phlegm was significantly associated with increasing exposure to all ambient pollutants except ozone. The strongest association was for NO_2, based on relative risk per interquartile range in the 12 communities (OR 2.7/24 ppb; CI, 1.4–5.3). The results suggest that children with a prior diagnosis of asthma are more likely to develop persistent lower respiratory tract symptoms when exposed to air pollution in Southern California. *Key words:* air pollution, asthma, bronchitis, children, respiratory tract. *Environ Health Perspect* 107:757–760 (1999). [Online 5 August 1999] *http://ehpnet1.niehs.nih.gov/docs/1999/107p757-760mcconnell/abstract.html*

The role of air pollution in the exacerbation of existing asthma has been studied and debated (*1–3*). In ecologic studies, the concentration of ambient particulate matter with aerodynamic diameter ≤ 10 μm (PM_{10}), primarily in combination with high sulfur dioxide (SO_2) and sulfate particulate matter, has been associated with increased hospitalization for asthma (*4*). As air pollutants, especially ozone, increase, emergency room visits for asthma increase, acute symptoms and medication use among asthmatic patients increase, and peak expiratory flow rate decreases (*5–8*).

There has been little population-based research examining the role of air pollution in causing bronchitis and associated chronic respiratory symptoms—cough and phlegm—in children with asthma or wheeze. One study showed an increase in prevalence of bronchitis associated with particulate pollution among children who had a history of wheezing or asthma (*9*). The results did not distinguish the effect of pollution in children with asthma from the effect in children who had a history of wheezing but not a diagnosis of asthma, differences that could be important in identifying the most susceptible populations for public health interventions and for further study.

The Children's Health Study is a population-based investigation of respiratory health in school children from 12 communities in Southern California with different mixes of air pollutants (*10*). We evaluated the effect of ambient pollutants on the prevalence of bronchitis, chronic cough, and phlegm among potentially sensitive children in this study; children were divided into three groups, based on a history of asthma, a history of wheezing but no asthma, and no history of either asthma or wheeze. Historic exposures in Southern California to ambient ozone (O_3), PM_{10}, and nitrogen dioxide (NO_2) have been among the highest in the United States (*2,3*), making this an ideal region for evaluating health effects. In addition, the mix of pollutants offers the opportunity to examine the impact of high particulate exposure on respiratory morbidity in the absence of the high ambient concentrations of SO_2 and SO_2-derived particulate sulfates characteristic of air pollution in the eastern United States.

Methods

The quasi-factorial, cross-sectional study design, health outcome evaluation, and exposure assessment have been described previously (*10*). Briefly, a total of 3,676 children participated (approximately 150 fourth graders, 75 seventh graders, and 75 tenth graders in each of 12 primarily suburban communities). These children were from primarily middle class public school classrooms selected based on historical measurements of air quality, demographic similarities, and a cooperative school district. In early 1993, a parent of each study subject provided written informed consent and completed a written questionnaire that characterized the child's history of respiratory illness and its associated risk factors. Principal outcomes of interest included *a)* one or more episodes of bronchitis (defined by the question "How many times in the past 12 months did your child have bronchitis?") and the following symptoms associated with bronchitis; *b)* chronic cough (defined by a "yes" answer to the question "During the past 12 months, has this child had a cough first thing in the morning that lasted for as long as 3

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months in a row?" or to the question "During the past 12 months, has this child had a cough at other times of the day that lasted for as much as 3 months in a row?"); *c*) chronic phlegm (defined by a "yes" answer to the question "Other than with colds, does this child usually seem congested in the chest or bring up phlegm?").

The association of air pollution with these symptoms was examined in children with *a*) asthma (defined by a "yes" answer to the question "Has a doctor ever diagnosed this child as having asthma?"); *b*) wheeze (defined by a "yes" answer to the question "Has your child's chest ever sounded wheezy or whistling, including times when he or she had a cold?"), exclusive of those children with asthma; and *c*) no history of asthma or of wheezing.

Children with questionnaire responses of "don't know" to asthma or wheeze or with missing values were excluded from the analysis, leaving 493 children with asthma, 653 with wheeze, and 2,211 with neither. The 12 communities were systematically selected to maximize the range of exposures and to obtain a variety of profiles of mixes of criteria air pollutants measured in Southern California (*10*). Using 1994 data from air monitoring instruments installed for the study, ambient exposure was estimated in each of the 12 communities for yearly average daily maximum 1-hr ozone concentration (mean 65.6 ppb; range 35.5–97.5 ppb), average 24-hr NO_2 concentration (mean 21.9 ppb; range 2.7–42.6 ppb), average 24-hr PM_{10} concentrations (mean 34.8 $\mu g/m^3$; range 13.0–70.7 $\mu g/m^3$), yearly mean 2-week averaged particulate matter < 2.5 μm in aerodynamic diameter ($PM_{2.5}$; mean 15.3 $\mu g/m^3$; range 6.7–31.5 $\mu g/m^3$), and yearly mean 2-week averaged gaseous acid (nitric and hydrochloric; mean 2.9 ppb; range 1.0–5.0 ppb). Exposures to particulate air pollution, NO_2, and acid were highly correlated (Table 1). In addition, we estimated exposure to ozone and NO_2 for 1992 (the year before the collection of symptom prevalence information) from data collected by the nearest station of the State of California South Coast Air Quality Monitoring District.

Analysis. The relationships between air pollution and the prevalence of bronchitis and phlegm were examined in each subgroup (children with asthma, wheeze only, and neither wheeze nor asthma) by using a two-stage modeling strategy that has been described in detail (*10*). Briefly, a logistic regression model was fitted in the first stage for a symptom within each subgroup as a function of community-specific intercepts, α_j, where j = 1, ..., 12, and personal covariates (age, sex, race, school grade, and membership in a health insurance plan). The adjusted community-specific intercepts and prevalence rates are related by $P_j = e^{\alpha_j}/(1 + e^{\alpha_j})$. In the second stage, these intercept terms representing the logit of the community-specific prevalence rates (P_j; j = 1, ..., 12), adjusted for personal covariates, were regressed on each community-specific ambient pollutant level by using a simple linear "ecologic" regression, i.e., logit $\alpha_j = \alpha + \beta Z_j$, where Z_j denotes the ambient pollution level for community j. Thus, β can be interpreted as the log odds ratio (per interquartile change) for each pollutant, adjusted for personal characteristics. The results from the models are presented as odds ratios (ORs), along with their 95% confidence intervals (CIs). Pictorial depiction of the results are presented using the prevalence scale for ease of interpretation. Additional potential confounders reported on the questionnaire and also considered included mildew, gas stove use or cockroaches in the child's home, current passive exposure to tobacco smoke (anyone who lived and regularly smoked inside the home), carpet in the child's bedroom, one or more pets, low parent or guardian education (grade 12 o less), and a large household (more than children under 18 years of age in the home). A 10% or greater change in β, due to addi tion of any one of these variables, was used a a criterion for confounding.

Table 1. Correlations of pollutants across 12 communities.

	PM_{10}	NO_2	Ozone	Acid	$PM_{2.5}$
PM_{10}	1.00				
NO_2	0.74*	1.00			
Ozone	0.32	0.33	1.00		
Acid	0.54	0.83*	0.69*	1.00	
$PM_{2.5}$	0.90*	0.83*	0.56	0.71*	1.00

Abbreviations: NO_2, nitrogen dioxide; $PM_{2.5}$, particulate matter < 2.5 μm in aerodynamic diameter; PM_{10}, particulate matter ≤ 10 μm in aerodynamic diameter.
*$p < 0.01$.

Results

Compared to children with a history o neither wheezing nor asthma, children with wheeze and children with asthma were much more likely to have bronchitis or related symptoms (Table 2). Children with asthma also were more likely to be boys, to have health insurance, and to report mildew or pets in the home, and were less likely to have parents with low educational achievement.

For children with asthma, all pollutants except ozone were positively associated with the risk of bronchitis, although the association was strongest for particulate pollutants (OR= 1.4 per interquartile range for both particle indices) and was statistically significant for PM_{10} (Table 3). There was a strong positive association between phlegm and ambient particulates and NO_2, and a slightly weaker, but also significant, association with acid pollutants. There was a modest positive, but not significant, association between cough and $PM_{2.5}$, NO_2, and acid. There was no association between air pollution and prevalence of bronchitis or associated symptoms among children with a history of wheezing (without asthma). Among children with neither wheeze nor asthma, there was a weak inverse association between bronchitis

Table 2. Distribution of bronchitic symptoms, demographic and other characteristics by history of wheeze and asthma.

	Asthma[a] (*n* = 493)	Wheeze[a] (*n* = 653)	No wheeze/no asthma[a] (*n* = 2,211)
Outcomes			
Bronchitis	164 (32.6)	147 (23.3)	117 (5.4)
Phlegm	122 (25.7)	86 (13.8)	93 (4.4)
Cough	83 (16.9)	63 (9.8)	84 (3.9)
Boys	276 (56.0)	305 (46.7)	1,023 (46.3)
Race/ethnicity			
White	324 (68.5)	428 (72.3)	1,335 (64.9)
Black	32 (6.8)	18 (3.0)	109 (5.3)
Asian	17 (3.6)	13 (2.2)	116 (5.6)
Other	88 (18.6)	127 (21.5)	478 (23.2)
Grade			
Fourth	229 (46.6)	335 (51.3)	1,102 (49.8)
Seventh	130 (26.4)	161 (24.7)	580 (26.2)
Tenth	134 (27.2)	157 (24.0)	529 (23.9)
Insurance	435 (90.4)	555 (87.7)	1,766 (82.3)
Low parental education	147 (30.1)	212 (33.9)	806 (37.8)
Age (mean ± SD)	12.4 ± 2.5	12.2 ± 2.5	12.3 ± 2.5
Large household	201 (41.4)	273 (42.6)	988 (45.7)
Bedroom carpet	408 (87.4)	562 (89.6)	1,839 (88.4)
Mildew	177 (37.1)	239 (38.2)	544 (25.9)
Cockroaches	47 (9.5)	75 (11.5)	242 (11.0)
Pets	403 (81.7)	540 (82.7)	1,666 (75.4)
Gas stove	392 (80.0)	522 (81.3)	1,718 (79.2)
Passive smoke	124 (25.7)	157 (24.5)	427 (19.7)

SD, standard deviation. Values shown are number (percent) except where indicated.
[a]Based on number responding positively for each variable/total number; variations in total number are due to missing values and "don't know" answers.

and pollution, which was marginally significant for particulate pollutants.

The strongest associations observed, between PM_{10} exposure and bronchitis and between NO_2 exposure and phlegm in the 12 communities, are presented in Figures 1 and 2 for children with asthma (and for comparison for children with neither asthma nor wheeze). For ease of interpretation, the figures are plotted using prevalence rates. Throughout the range of exposure to PM_{10} and NO_2 across the 12 communities, there was increasing prevalence of bronchitis (R^2 = 0.44; p = 0.02) and phlegm (R^2 = 0.54; p = 0.006), respectively. Valid estimates of community-specific pollutant concentrations were available only for NO_2 (11 of 12 communities) and for ozone from existing air monitoring stations for 1992 (the full year most closely corresponding to the reported symptoms). Mean exposure estimates and interquartile ranges for both pollutants and the rank order of communities were very similar to those for 1994, which were used in the results presented above. The associations among children with asthma between these pollutants and bronchitic symptoms were also similar for both years.

There was a small increase in the association of all pollutants with phlegm after adjusting for reported mildew in the houses of children with asthma. Otherwise, the observed pattern of associations among asthmatic children did not change substantially after adjusting for additional potential confounding variables. The risk of chronic phlegm among girls was more than double the risk for boys for particulates, NO_2, and acid, but this difference between sexes was not statistically significant. Similar effect modification by sex was not observed for bronchitis and could not be evaluated for chronic cough because there were too few children reporting chronic cough to determine a maximum likelihood estimate in the first stage model.

Discussion

Among children with asthma in this study, increased particulate air pollution was associated with significantly increased prevalence of chronic phlegm production and with bronchitis. There also was a strong association of NO_2 and gaseous acid with increased phlegm prevalence and a modest and nonsignificant association of NO_2 with increased prevalence of bronchitis. No significant associations were found between air pollution and chronic cough, but power to assess this relationship was limited by the small number of children with cough. The increased prevalence of bronchitis observed among children with asthma is consistent with the known overlap between the two conditions (*11,12*). In the context of this investigation, bronchitis and related chronic symptoms may represent exacerbation of asthma by air pollution rather than conditions that can be separated from asthma. Alternatively, the results may have reflected the persistent respiratory symptoms reported among asthmatic children with viral infections in communities with air pollution, especially NO_2 (*13*). Because of the high correlation of particulate air pollution, NO_2, and acid (Table 1), it was not possible to distinguish which of these pollutants was more likely to be responsible for the observed effects.

Physician-diagnosed asthma and the outcomes of interest, although relatively imprecise end points with somewhat limited reliability (*14*), have been widely used in epidemiologic studies of children, and physician-diagnosed asthma has been found to reflect what physicians actually reported to patients, at least in adults (*15*). In this study, children with reports of physician-diagnosed asthma were uniquely sensitive to air pollution in Southern California. Children with a history of wheezing but without physician-diagnosed asthma are an even more heterogeneous group, which includes children with undiagnosed asthma, with wheezing illness in infancy and early life associated with respiratory infections, or with small airways (*16*), in addition to a large number of other wheezing conditions that must be excluded before the diagnosis of asthma can be made (*12*). In this study, although air pollution was not associated with chronic symptoms among children with wheeze, there was no inverse relationship between air pollution and bronchitis, as was observed for children without wheeze (Table 3), an association that may reflect underlying unadjusted confounding by unmeasured covariates in the study communities. It is possible that more accurate

Table 3. Risk of bronchitis, phlegm, and cough by air pollutant concentration[a] among children with a history of asthma, wheeze, and neither asthma nor wheeze.

	Asthma		Wheeze/no asthma		No wheeze/no asthma	
	OR	CI	OR	CI	OR	CI
Bronchitis	(n = 154/473)[b]		(n = 147/630)[b]		(n = 117/2,162)[b]	
PM_{10}	1.4	1.1–1.8	0.9	0.7–1.3	0.7	0.4–1.0
$PM_{2.5}$	1.4	0.9–2.3	0.9	0.6–1.4	0.5	0.3–1.0
NO_2	1.3	0.8–2.2	0.9	0.6–1.4	0.8	0.4–1.7
Ozone	1.0	0.6–1.7	1.1	0.7–1.6	0.9	0.4–1.8
Acid	1.1	0.7–1.6	0.9	0.7–1.6	0.9	0.5–1.0
Phlegm	(n = 122/475)[b]		(n = 86/625)[b]		(n = 93/2,092)[b]	
PM_{10}	2.1	1.4–3.3	0.9	0.6–1.4	0.8	0.6–1.3
$PM_{2.5}$	2.6	1.2–5.4	1.0	0.6–1.8	0.8	0.4–1.5
NO_2	2.7	1.4–5.3	1.0	0.6–1.8	1.0	0.5–1.9
Ozone	1.2	0.5–3.1	0.8	0.5–1.4	0.8	0.5–1.5
Acid	1.9	1.0–3.6	0.9	0.6–1.4	1.1	0.7–1.8
Cough	(n = 84/491)[b]		(n = 63/644)[b]		(n = 84/2,180)[b]	
PM_{10}	1.1	0.8–1.7	1.2	0.9–1.8	0.9	0.7–1.2
$PM_{2.5}$	1.3	0.7–2.4	1.1	0.6–1.9	0.9	0.6–1.3
NO_2	1.6	0.9–2.7	1.3	0.7–2.2	0.9	0.5–1.2
Ozone	1.1	0.6–2.0	0.7	0.5–1.1	0.9	0.6–1.3
Acid	1.4	0.9–2.1	1.0	0.6–1.5	0.9	0.7–1.3

Abbreviations: CI, 95% confidence interval; NO_2, nitrogen dioxide; OR, odds ratio; PM_{10}, particulate matter < 10 µm in aerodynamic diameter; $PM_{2.5}$, particulate matter <2.5 µm in aerodynamic diameter.

[a]Prevalence ORs were calculated per interquartile range of yearly mean exposure for each pollutant (daily peak ozone, 32 ppb, daily average PM_{10}, 19 µg/m^3; daily average NO_2, 24 ppb; 2 week average $PM_{2.5}$, 15 µg/m^3; and acid (1.8 ppb of HCl + HNO_3, measured on a mole basis)). All models were adjusted for age, sex, race, school grade, and membership in a health insurance plan. [b]Number responding positively for each outcome/total in stratum; total varies by outcome because of variable "don't know" responses or missing values (which were excluded).

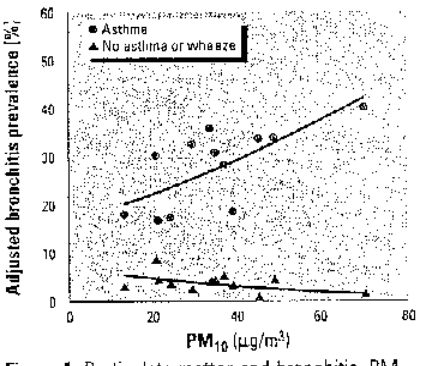

Figure 1. Particulate matter and bronchitis. PM_{10}, particulate matter ≤ 10 µm in aerodynamic diameter.

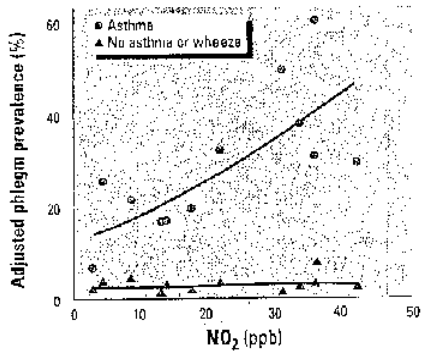

Figure 2. Nitrogen dioxide and phlegm.

classification of individuals based on objective hallmarks of asthma, such as atopy or bronchial hyperreactivity, would strengthen the observed associations. Individuals with greater airway lability, for example, have been found to be more responsive acutely to air pollution, regardless of asthma diagnosis (*17*).

There have been few other population-based studies of air pollution and prevalence of chronic respiratory symptoms among children with asthma. In the Six Cities Study, Dockery et al. (*9*) reported an association between exposure to particulate matter < 15 μm in diameter and the prevalence of bronchitis among children with wheeze or asthma. In that study, an association with NO_2 was not reported. Our results differed from those of Dockery et al (*18*) in their study of children in 24 North American cities; they reported that an observed positive association of bronchitis prevalence with particle strong acidity in the overall populaton of children was not significantly different among children with asthma. Their results were heavily influenced by eastern cities. In Southern California ambient particulate matter is relatively low in sulfates, and our results suggest that the increased risk among asthmatic children of lower respiratory symptoms associated with particulate exposures does not depend on the presence of SO_2 and SO_2-derived sulfates, which are characteristic of air pollution in the eastern United States.

Our results are consistent with previous studies that demonstrate acute exacerbation of childhood asthma by ambient PM_{10} pollution (unconfounded by exposure to other criteria pollutants) (*19–21*). In chamber studies, Hackney et al. (*22*) found that patients with asthma developed lower respiratory symptoms on exposure to high concentrations of fine sulfuric acid aerosol (but not to concentrations nearer to ambient exposures). The relevance of these results is unclear for Southern California, where acid air pollution is primarily gaseous nitric acid derived from NO_2. A subset of asthmatics has been reported to have consistent acute decrements in lung function in response to exposures to NO_2 (*23*). However, other studies have not consistently demonstrated acute exacerbation of symptoms among asthmatics exposed to acid aerosols (*3*) or among asthmatics acutely or chronically exposed to NO_2 (as a result of indoor gas stoves and space heaters or ambient air pollution) (*4*).

The absence of an observed association in this study between ozone and prevalence of chronic symptoms among children with asthma is not entirely consistent with studies of acute effects of exposure to ozone pollution. Emergency room visits for asthma (*5,6*) and acute symptoms in panels of children with asthma (*7,8*), including children in Southern California (*24,25*), have been associated with ozone exposure. However, some experimental chamber studies suggest that asthmatic volunteers, in the absence of intense exercise, may not be more sensitive to ozone than subjects without asthma (*4*). In addition, acute exacerbation of asthma by ozone does not necessarily mean that chronic bronchitic symptoms must result from chronic exposure. Attenuation by repeated exposure of the acute response to ozone has been observed (*3*). In the Six Cities Study, no association was observed between ozone and prevalence of bronchitis among children with wheeze (*9*).

There were several limitations to our study, including the use of 1994 exposure information to evaluate the relationship with symptoms corresponding to the 12 months before the questionnaire was completed in early 1993. However, a comparison of measured exposures in 1994 with estimated exposures in 1992, based on NO_2 and ozone measured at existing monitoring stations, suggests that ambient exposures and effects were very similar in both years. The misclassification of personal exposure based on community monitors is likely to result in underestimation of a true association. Error also is likely in reporting bronchitis and phlegm, but this bias also might be expected to dampen the observed relationship between air pollution and a true effect. Finally, exposure to pollutants could be associated independently with the prevalence of asthma and of bronchitis, producing confounding. However, in these data there was no association between bronchitis and pollution, except in the population with asthma; in previous analyses we have demonstrated that air pollution was not associated with asthma prevalence (*10*).

The results of this study indicate that children with asthma are especially sensitive to the effects of air pollution in Southern California. Prospective follow-up of this cohort of children, who are being reexamined yearly, will identify the onset of new symptoms indicative of asthma activity in relation to exposure to criteria pollutants. Year-to-year variability in the mix of pollutants associated with symptoms may permit the evaluation of the contribution of individual pollutants.

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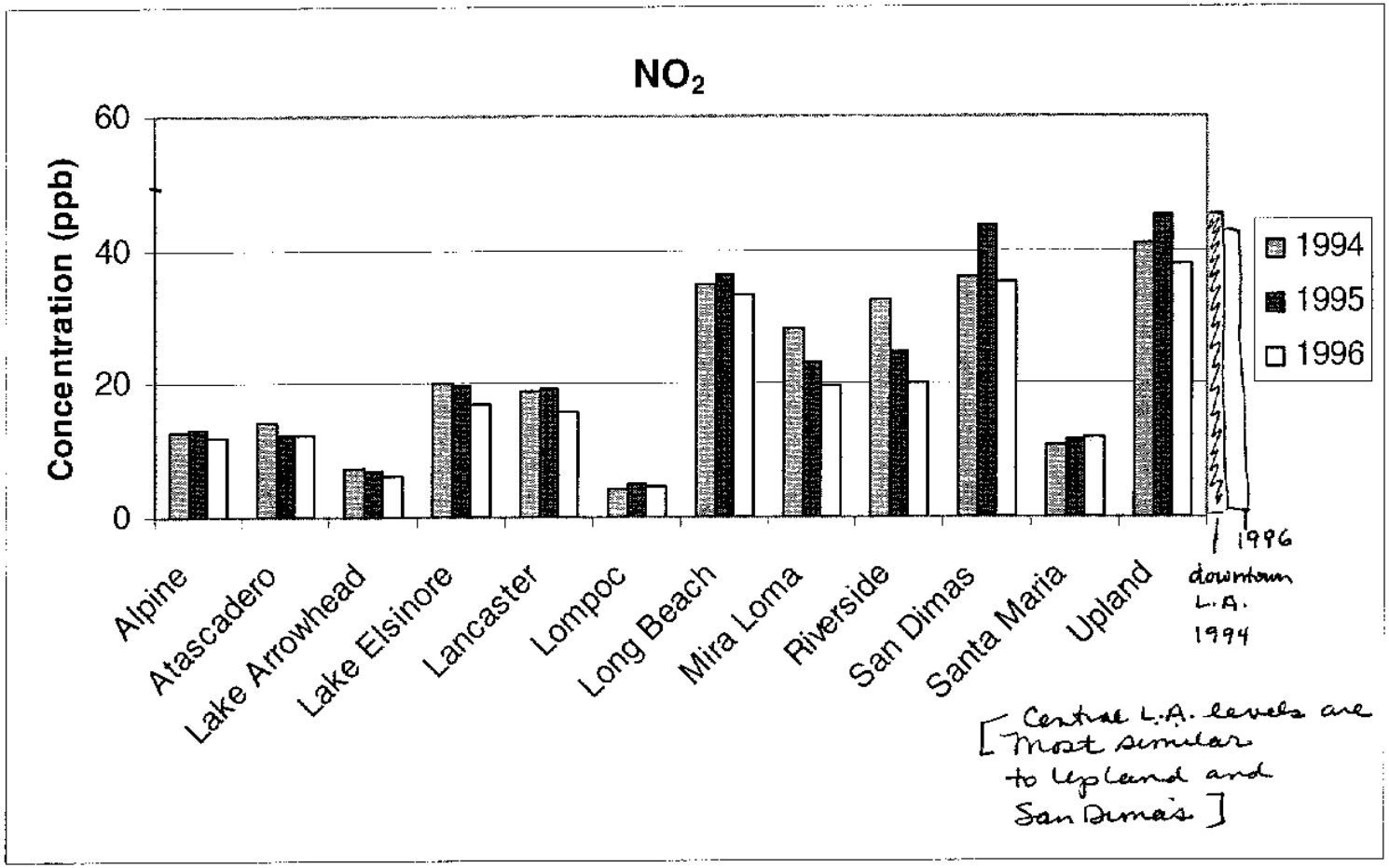
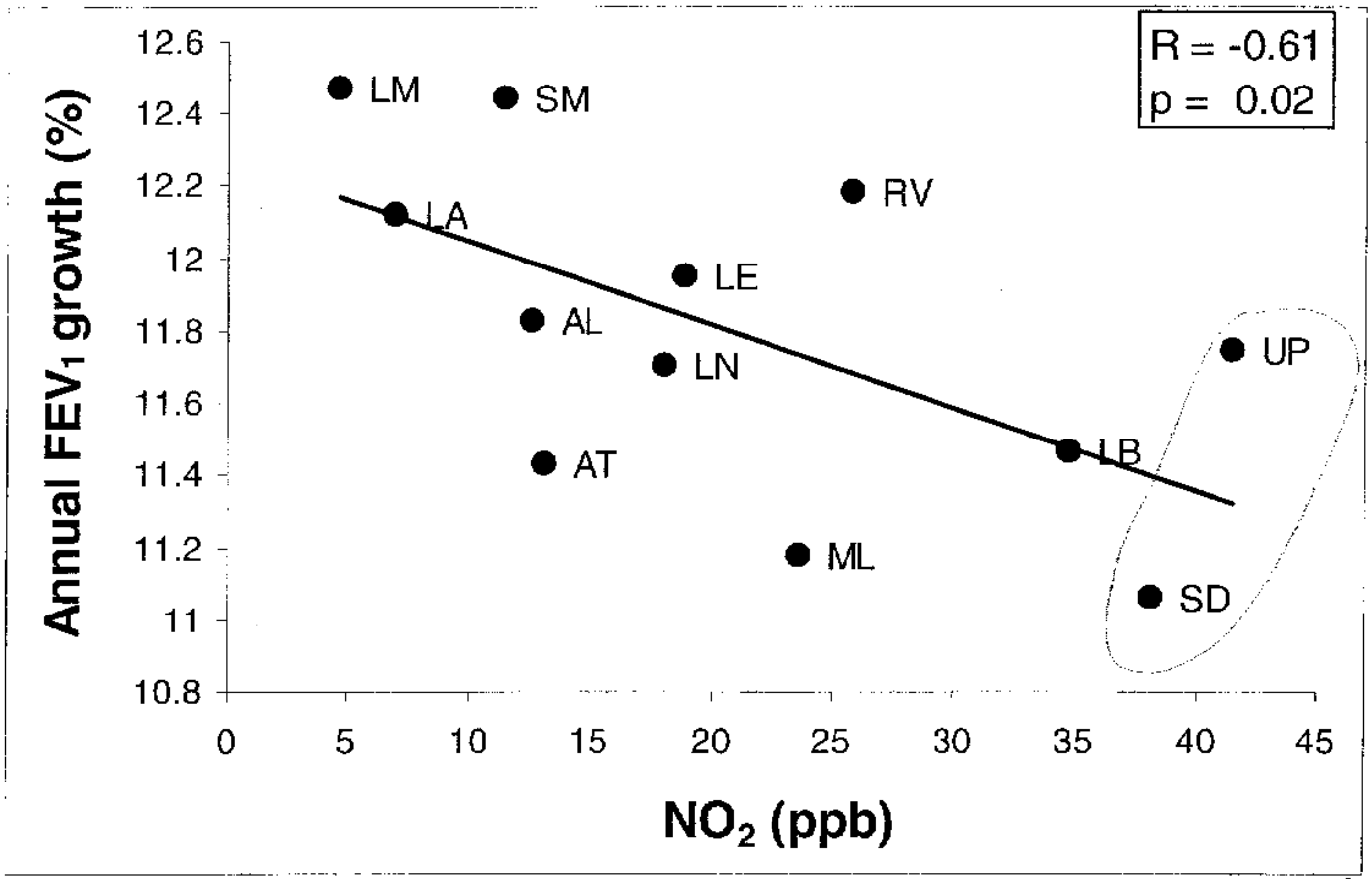
NO_2 Levels in 12 Communities



FEV_1 Growth Rates vs. NO_2



Levels are most similar to Upland & San Dimas NO_2 levels

Wednesday, February 7, 2001
Home Edition
Section: Metro
Page: B-3

L.A., Inglewood Agree on Airport Noise, Traffic Issues

Accord: LAX won't block any lawsuits by soundproofed homes' occupants. Century Boulevard upgrade planned.

By: DOUGLAS P. SHUIT
TIMES STAFF WRITER

City officials from Los Angeles and Inglewood reached an agreement Tuesday on a controversial plan designed to address noise, traffic and other environmental concerns stemming from growth at Los Angeles International Airport.

The agreement, marking a milestone in a long-running fight between the airport administration and residents of the city on the eastern boundary of LAX, covers soundproofing of homes, a $10-million upgrading of Century Boulevard and efforts to reduce air pollution.

The agreement was forged during a series of closed-door meetings over a period of months by representatives of both cities.

The Los Angeles Board of Airport Commissioners approved the agreement during a closed-door session Tuesday, then ratified it in an open meeting. Hours later, it was approved on a 3-1 vote by the Inglewood City Council.

Lydia H. Kennard, executive director of Los Angeles World Airports, the city agency that operates LAX, said the agreement signaled "a great partnership" between Inglewood and the airport. She said the accord was about being "a good neighbor" and "has nothing to do" with the long-range master plan released by the airport last month.

But critics of airport expansion say the agreement is clearly designed to pave the way to approval of the LAX master plan.

Rep. Maxine Waters (D-Los Angeles), in a letter faxed Tuesday to the Inglewood City Council, said she was adamantly opposed to the agreement. She called it "a cynical attempt to make it appear that the concerns raised regarding the expansion

of Los Angeles International Airport will be corrected and LAX expansion will be acceptable to the community. This is certainly not true."

Inglewood Councilwoman Judy Dunlap, who cast the lone vote against the agreement, said approval of the memorandum "is a tacit approval of airport expansion regardless of what it appears to be on its face." She complained about the secrecy surrounding approval of the agreement, which she said was kept from the public until after the vote.

Inglewood City Administrator Joseph T. Rouzan Jr. said a key part of the memorandum involved an agreement by LAX to suspend a requirement that Inglewood residents waive their legal rights to sue the airport if their homes were soundproofed. More than 11,000 homes qualify for soundproofing, at an average cost of about $25,000 a home.

The legal waivers are a hot-button issue in Inglewood. Residents complain that they should not be required to sign away their legal rights in order to soundproof their homes.

Rouzan said the agreement does not address the LAX expansion plan. "All we are talking about is giving our people relief from the noise and pollution from the airport and getting money to fix up our homes," he said.

LAX also agreed to spend up to $10 million to soundproof homes that otherwise would not qualify, to launch new night-flight studies and to expand studies of the air quality near LAX. The airport also pledged to set up a program to create more jobs for Inglewood residents.

Descriptors: Los Angeles International Airport, Los Angeles - Development and Redevelopment, Inglewood (Ca) - Development And Redevelopment, Airport Noise, Traffic, Soundproofing, Airports - Los Angeles, Community Relations

DANGEROUS BY DESIGN:
PEDESTRIAN SAFETY IN CALIFORNIA

Surface Transportation Policy Project
September 2000

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EXECUTIVE SUMMARY

Pedestrian accidents are a significant public health problem in California and are one of the leading causes of fatal and hospitalized injuries for children statewide. Pedestrian fatalities alone accounted for nearly 20 percent of all traffic-related deaths in the state, even though only eight percent of all trips are made on foot. The number of pedestrians killed as a percentage of total traffic fatalities ranged as high as 26 percent in Sacramento County, 30 percent in Los Angeles County, and 54 percent in San Francisco County (Table 2).

According to an analysis of 1999 data, pedestrian accidents cost California nearly $4 billion in lost economic productivity, medical expenses and pain and suffering (Table 6). Yet California spends less than one percent of its federal transportation funds on pedestrian safety, less than any other state in the nation. Ironically, the most visible effort statewide related to pedestrians has been the highly controversial removal of crosswalks under the guise of improved safety.

THE PROBLEM

An analysis of statewide data collected by the Department of California Highway Patrol shows that in 1999, at least 688 pedestrians died and another 14,346 were injured on California's streets. Los Angeles County experienced by far the greatest number of pedestrian fatalities and injuries - 203 pedestrian deaths and 5,377 injuries represent more than a third of all pedestrian fatalities and injuries in the state. But Los Angeles is also California's most populous county, and if the rankings are adjusted to reflect population, San Francisco ranks as having *per person* the highest incidence of pedestrian fatalities and deaths. However, more people walk in San Francisco than in any other California city because there is a mix of residential, retail and other land uses within walking distance, population and development patterns are dense, and public transit is convenient. Therefore, any real measure of the relative danger facing pedestrians must factor in the amount of walking, or "exposure," that occurs in each location.

These factors are all incorporated in a "pedestrian danger index," arrived at by dividing the number of fatalities and injuries in each county by population, and then dividing that number by the county's "exposure index," or overall levels of

pedestrian activity. This number is then adjusted to a relative scale from 1 to 100, with 100 being the most dangerous.

Using the pedestrian danger index, Sacramento County ranks as the most dangerous county for pedestrians in California in 1999, followed by Contra Costa, Los Angeles, Santa Clara and San Mateo (Table 1). This is the first time Sacramento County has ranked most dangerous since our survey began in 1996. Ventura County ranks in the top 10 for the first time since 1996, and San Francisco, San Joaquin and Tulare counties all climbed in the rankings. While Los Angeles County dropped from first to third, the number of fatalities actually increased from 200 to 203, and the drop in the rankings had more to do with the fact that the number of fatalities increased more sharply in other counties. The ranking shows that counties in Southern California, the Silicon Valley and the Central Valley are among the most dangerous in the state.

As alarming as these figures are they may not fully measure the danger to pedestrians because it's been estimated that injuries are underreported by as much as 56 percent. Police often do not report collisions that result in emergency room treatment but not hospitalization, and don't report collisions that occur on private property, or in alleys or driveways. These are the locations where many accidents involving the youngest children occur. It is important to note that pedestrian injuries account for two-thirds of all severe traffic-related injuries among children, and that the probability of a child dying or becoming severely disabled exceeds that of all other causes of childhood illness. The elderly are also two to four times more likely to die when struck.

As with automobile fatalities, the total number of pedestrian deaths has dropped slightly in the last few years. However, while the amount of driving is increasing, statistics show that the amount of walking is declining. This may mean that while driving is getting safer, walking is getting more dangerous. The sharp decline in walking has coincided with significant increases in obesity and inactivity among the general population. These trends have so alarmed health officials that they have joined with pedestrian advocates in calling for policies and investments that make communities safer and more walkable.

THE VICTIMS

An analysis of the most recent statewide hospitalization data (a smaller but more detailed database that records race and ethnicity information) shows that Latinos and African Americans were more likely to be injured relative to their share of California's overall population. While 30 percent of the population of California is Latino, 37 percent of all hospitalized pedestrian fatalities and injuries in 1998 were Latino. African Americans represented 7 percent of the state's population but accounted for 10 percent of all hospitalized pedestrian fatalities and injuries (Table 3). Race and ethnicity data at the local level in California points to a similar trend, with Latinos and African Americans disproportionately represented as victims of pedestrian vehicle crashes in nearly every one of the state's most populous counties (Table 4).

Prior research, supported here with a new analysis by the Latino Issues Forum, also shows that low-income populations are more likely to be victims in pedestrian accidents. While 35 percent of all pedestrian victims under the age of 65 were covered by Medi-Cal, just 11 percent of the general population under 65 were covered by Medi-Cal. While the higher risk for low-income populations has been documented in dozens of studies conducted by health professionals here and abroad, this information has largely been absent from the public debate over pedestrian safety in California. Further analysis reveals hospital charges alone topped $200 million for pedestrian victims in 1998, $23 million of which was paid out of pocket. But when factoring in lost economic productivity and pain and suffering, pedestrian fatalities and injuries are estimated to cost California nearly $4 billion a year.

Other studies show that pedestrian injuries and deaths, particularly among children, are correlated to income and several other socioeconomic factors including access to a car. Factors include unemployment, single-parent and especially female-headed households, young mothers, low levels of education, the number of times a family has moved, and the number of children in a household. More than one study found that lack of access to a car was associated with a doubling of the risk of injury as a pedestrian.

Limiting exposure by simply staying inside, however, has grave implications for both health and well-being. The vast majority of children already fall short of the recommended daily dose of activity, which can have a negative effect on both a child's physical and mental development. Concerns have also been raised about the extent to which transportation policy and investments focused on

improving travel by automobile have circumscribed the independence and mobility of both children and the elderly.

THE RESPONSE

For decades state and local governments have focused transportation policy and investments on accommodating more traffic by widening streets, increasing speed limits, removing crosswalks and enacting laws that give vehicles the advantage - such as allowing right turns on a red light. Meantime rapid suburbanization has dramatically increased traffic and spread development patterns ever further apart so that stores, homes, schools and other destinations are no longer easily accessible on foot. The result has been deadly for pedestrians. Studies show that traffic speed and traffic volume are two of the environmental factors with the highest correlation to pedestrian injury and death. One of the more disturbing trends in California is the removal of crosswalks at uncontrolled intersections (intersections without a stop sign or traffic signal), a policy that has left pedestrians to largely fend for themselves.

Moreover, in order to provide a safe environment for pedestrians, the basic infrastructure of sidewalks, paths and crosswalks must be provided. Yet an analysis of federal transportation funding shows that while California has the second highest share of pedestrian deaths compared to all traffic-related fatalities, it ranks last among the 50 states in spending on pedestrians. While an average of $40 per person in federal transportation funds was spent on highway projects statewide, an average of just 4 cents per person was spent on improving conditions for pedestrians. Even though statewide roughly 20 percent of all traffic fatalities are pedestrians, less than one percent of all federal traffic safety money was spent on making the streets safer for pedestrians.

Pedestrians, even if they are young children, are often found to be at fault in crashes, obscuring the fact that the real problem may be that laws favor motorists, that speed limits are set too high, or that there are a lack of crosswalks and safe places for children to play. The tendency to blame pedestrians creates the impression among policy makers and the public that nothing that can be done. As a result efforts to improve pedestrian safety are often limited to pedestrian education, even though numerous health studies conclude that education alone has limited effectiveness, especially with children,

and that modifications in street design and the lowering and enforcement of speed limits are also needed.

SOLUTIONS

The report also discusses how local and state policies across California that have focused on accommodating more traffic have been deadly for pedestrians, and why a tendency to blame pedestrians for collisions has served to further hamper programs and policies that could potentially prevent thousands of additional injuries. In conclusion, new policies and investments are suggested that can make California's cities, towns and suburbs safe and walkable. The report's recommendations include:

1. **Dedicate a fair share of traffic safety funding to pedestrians.** Pedestrian accidents cost California nearly $4 billion in 1999 alone, while spending on pedestrian safety measures is a mere fraction of that figure. If 20 percent of all traffic fatalities are pedestrians, it stands to reason that a similar amount of safety funding should be directed toward solving the problem.

2. **Suspend California's crosswalk removal policy.** The trend toward removing crosswalks due to the belief that they give pedestrians a false sense of security is like removing traffic

signals so that motorists will proceed with greater caution. State agencies need to do more for pedestrians, not less. California should develop a new minimum design standard for crosswalks that includes "zebra" striping and overhead lighting or flashing signals.

3. **Consider pedestrians during the design phase of every project.** Communities must be designed so that people have a place to walk to, which means that shops, offices, schools, libraries and transit stops are located within reasonable walking distance. All facilities should be designed for the disabled and meet basic standards established in the Americans with Disabilities Act.

4. **Collect more information on pedestrians.** Existing databases provide little information about the amount of pedestrian activity in different locations, the risks associated with walking, the effectiveness of pedestrian safety measures, or even how much is spent on pedestrian safety. This lack of information makes pinpointing underlying problems and solutions difficult.

5. **Develop a statewide blueprint for bicycling and walking.** California needs a statewide vision and strategy for maximizing the benefits of bicycling and walking that includes goals and an action plan for all levels of government. This includes targeted strategies like Safe Routes to School programs, as well as an economic analysis of the potential benefits of bicycle tourism, regional trail systems and more pedestrian-oriented developments.

The risk of injury and death, however, varies depending not only on where you live but also to a large degree on your race, ethnicity and income. This phenomenon has been widely reported in studies and surveys conducted both in the U.S. and abroad, but has largely been absent from the public discussions and debate surrounding pedestrian safety in California.

An analysis of the most recent statewide hospitalization data (a smaller but more detailed database that records race and ethnicity information) shows that Latinos and African Americans were more likely to be injured relative to their share of California's overall population. While 30 percent of the population of California is Latino, 37 percent of all hospitalized pedestrian fatalities and injuries in 1998 were Latino. African Americans represented 7 percent of the state's population but accounted for 10 percent of all hospitalized pedestrian fatalities and injuries. Race and ethnicity data at the local level in California points to a similar trend, with Latinos and African Americans disproportionately represented as victims of pedestrian-vehicle crashes in nearly every one of the state's most populous counties (see Table 4).

TABLE 3: STATEWIDE RACIAL BREAKDOWN OF PEDESTRIAN INJURIES AND FATALITIES —1998

Race/Ethnicity	Pedestrian Fatal Injuries 1998	Hospitalized Pedestrian Injuries 1998	Total Hospitalized Incidents 1998	Percent Share of Total Incidents	Percent Share of Total Populatio n
HISPANIC	246	1859	2105	37.3	29.7
WHITE	300	1947	2247	39.8	51.6
BLACK	67	615	682	12.1	7.2
ASIAN/ PACIFIC ISLANDER	43	340	383	6.8	11.1
UNKNOWN/ OTHER	1	180	181	3.2	--
NATIVE AMERICAN	5	31	36	.6	.6
TOTAL	662	4972	5634	100.0	100.0

NOTE: Share of total population is based on California Department of Finance 1998 estimates. Totals may not add due to rounding. Data is based on fatal hospitalized and nonfatal hospitalized pedestrian incidents only. SOURCE: Latino Issues Forum; California Department of Health Services, Death Records; California Office of Statewide Health Planning and Development, Hospital Discharge Dataset; California Department of Finance.

Several recent surveys elsewhere in the United States have produced similar findings. The Centers for Disease Control in Atlanta reported recently that Latinos in Atlanta were six times more likely to be hit and killed than whites. A survey conducted by the Washington Post found that Latinos in suburban Washington D.C. were three times more likely to be hit and killed.[11] Another survey conducted by the Los Angeles Times in Orange County showed that while Latinos make up 28 percent of the county's population, they accounted for 40 percent of all pedestrian injuries and 43 percent of all deaths.[12]

PEDESTRIAN PROFILE #1:
NANCY HERNANDEZ, 43
COMMUNITY ORGANIZER
EL SERENO, LOS ANGELES COUNTY,
CALIFORNIA

The predominantly Spanish-speaking El Sereno neighborhood in Los Angeles County where Nancy Hernandez lives is marked by the sights and sounds of busy foot traffic. Child pedestrians and bicyclists from elementary, middle and high schools, elderly pedestrians from the Senior Center, park-goers, patrons from small restaurants and stores, and people getting on and off local buses create a busy, lively street life. All but the high school are located on a half mile strip down Eastern Street.

Hernandez regularly takes transit and walks. But she says there's a mean side to the streets in her neighborhood: residents are fearful of being hit and killed by speeding cars. "There's so much traffic in the morning, it's scary," explains Hernandez. "Cars are on the crosswalk. Instead of walking in front of the cars,

you have to squeeze in between to cross the street. You don't know if the cars are going to reverse and squash you."

Over six months ago, Hernandez witnessed a tragic accident in the neighborhood. A boy was hit while crossing the street towards his mother on the other side, he was thrown into the other direction of traffic and struck again and killed by a second car. Both were hit and runs.

"I have three girls," says Hernandez. "When we do have to walk, it's scary. I've taught them to look four ways, not just two, before they cross." Area residents are now circulating petitions to install a crossing signal or warning light to slow down traffic or retrofit Eastern Street with other traffic calming measures.

Studies by both UC-Irvine[13] and the Santa Ana Unified School District in Orange County[14] show that Latino children are twice as likely to be injured or killed. Several studies show the risk of injury to be significantly higher among African American children than other children,[15] and in census tracts with higher percentages of non-white residents.[16] In New Mexico, Native American children had a death rate 2.5 times that of other ethnic and racial groups.[17]

"Pedestrian injury death rates for non-white children are consistently found to be higher than the rates for white children," write UC-Irvine researchers in a review of nearly 100 studies on child pedestrian injuries, which was presented at a 1998 Centers for Disease Control-sponsored conference.[18] An analysis of child pedestrian injuries and fatalities conducted by STPP and the Latino Issues Forum in 1999 shows a similar trend statewide, with Latino children comprising 39 percent of California's child population but 48 percent of all pedestrian incidents, and African-American children accounting for 8 percent of the state's child population but 14 percent of all pedestrian incidents.

TABLE 4: RACIAL BREAKDOWN OF HOSPITALIZED PEDESTRIAN INJURIES AND FATALITIES BY COUNTY —1998

COUNTY	PERCENT SHARE OF	WHITE	BLACK	HISPANIC	NATIVE AMERICAN	ASIAN/ PACIFIC ISLANDER	OTHER/ UNKNOWN
ALAMEDA	Ped Incidents	37 %	27 %	14 %	n/a	10 %	13 %
	Population	46 %	18 %	17 %	n/a	19 %	n/a
CONTRA COSTA	Ped Incidents	51 %	23 %	n/a	n/a	n/a	n/a
	Population	65 %	9 %	13 %	1 %	11 %	n/a
FRESNO	Ped Incidents	33 %	n/a	48 %	n/a	n/a	n/a
	Population	45 %	5 %	38 %	1 %	11 %	n/a
KERN	Ped Incidents	56 %	n/a	26 %	n/a	n/a	n/a
	Population	58 %	6 %	32 %	1 %	3 %	n/a
LOS ANGELES	Ped Incidents	27 %	16 %	48 %	n/a	6 %	3 %
	Population	33 %	10 %	44 %	n/a	13 %	n/a
MONTEREY	Ped Incidents	41 %	n/a	52 %	n/a	n/a	n/a
	Population	47 %	6 %	39 %	1 %	8 %	n/a
ORANGE	Ped Incidents	39 %	n/a	45 %	n/a	11 %	n/a
	Population	57 %	2 %	28 %	n/a	12 %	n/a
RIVERSIDE	Ped Incidents	48 %	n/a	42 %	n/a	n/a	n/a
	Population	61 %	5 %	29 %	1 %	4 %	n/a
SACRAMENTO	Ped Incidents	56 %	17 %	15 %	n/a	n/a	n/a
	Population	65 %	10 %	13 %	1 %	11 %	n/a
SAN BERNARDINO	Ped Incidents	46 %	15 %	34 %	n/a	n/a	n/a
	Population	55 %	9 %	31 %	1 %	5 %	n/a
SAN DIEGO	Ped Incidents	48 %	11 %	33 %	n/a	4 %	n/a
	Population	61 %	6 %	24 %	1 %	8 %	n/a
SAN FRANCISCO	Ped Incidents	37 %	16 %	18 %	n/a	26 %	n/a
	Population	40 %	10 %	16 %	n/a	34 %	n/a
SAN JOAQUIN	Ped Incidents	44 %	n/a	36 %	n/a	n/a	n/a
	Population	55 %	5 %	25 %	n/a	14 %	n/a

SAN MATEO	Ped Incidents	52 %	n/a	27 %	n/a	n/a	n/a
	Population	53 %	5 %	21 %	n/a	20 %	n/a
SANTA BARBARA	Ped Incidents	44 %	n/a	44 %	n/a	n/a	n/a
	Population	61 %	3 %	31 %	n/a	5 %	n/a
SANTA CLARA	Ped Incidents	37 %	n/a	42 %	n/a	14 %	n/a
	Population	50 %	4 %	24 %	n/a	22 %	n/a
VENTURA	Ped Incidents	49 %	n/a	42 %	n/a	n/a	n/a
	Population	62 %	2 %	30 %	n/a	6 %	n/a
CALIFORNIA	Ped Incidents	40 %	12 %	37 %	1 %	7 %	3 %
	Population	52 %	7 %	30 %	1 %	11 %	n/a

NOTE: n/a unreported due to statistically insignificant data. See Appendix for race and population breakdowns by absolute numbers by county. SOURCE: Latino Issues Forum; California Department of Health Services, Death Records; California Office of Statewide Health Planning and Development, Hospital Discharge Dataset; California Department of Health Services, Epidemiology and Prevention for Injury Control Branch; California Department of Finance.

IN THEIR OWN WORDS
MIMI SOTO, 24
COMMUNITY ORGANIZER
EAST LOS ANGELES
PART OF AN EXCHANGE WITH TRANSPORTATION OFFICIALS AT A COMMUNITY MEETING

"You didn't even tell us that you were going to remove the crosswalk. When we said we wanted it back you told us we didn't meet the criteria. So we said, that's okay, because what we really need is a stop light. No, you said, we don't meet the criteria. So we said please, at least put in a stop sign because the cars drive too fast. No, you said, we don't meet the criteria. Well I say the problem isn't that we don't meet your criteria. The problem is that your criteria does nothing to address the safety problems in our neighborhood."

California hospitalization statistics also concur with the results of dozens of health studies in the U.S., Canada, Great Britain and New Zealand that correlate the risk of pedestrian injury and death, particularly among children, to income and related socioeconomic factors. These factors include unemployment, single-parent and especially female-headed households, young mothers, low levels of education, the number of times a family has moved, and the number of children in a household. Children in families without a car are twice as likely to be injured as those in car-owning families.[19]

Studies in Quebec[20] and in Scotland[21] found that poor children were four times as likely to be injured as children of wealthy families. A study in Baltimore found that children whose parents own a car and home cross an average of 3.7 streets a day, whereas children whose parents do not own both a car and home cross an average of 5.4 streets a day, a difference that is, say the researchers, "highly significant." [22]

Ian Roberts, who has done extensive research on the socioeconomic and racial determinants of pedestrian injury and death, wrote in the British Medical Journal, "For injuries to child pedestrians the number of roads that children cross is a key determinant of the occurrence of injury. Children in families with the lowest quarter of income cross 50 percent more roads than those in families in the highest quarter." Roberts goes on to add, "The strong association between injury and poverty is the most consistent finding in published epidemiological studies of childhood injury . . . the association between injury and poverty is particularly strong for traffic accidents."[23]

While no exact statistics are collected on socioeconomic status for pedestrian victims in California, both independent research and existing data on health insurance strongly suggest that that the state's pedestrian accident victims are likely to be low-income. Of all hospitalized pedestrian injuries under 65 years of age in 1998, nearly 35 percent were covered by Medi-Cal. Of that same age group in the population at large, only 11 percent were covered by Medi-Cal in the same year (see Table 5). Caps on earnings for Medi-Cal insurance requires that recipients be in the lowest income brackets.