

Long Beach Alliance For
Children With Asthma

World Asthma Day
May 3, 2005

Long Beach Alliance for Children with Asthma
2651 Elm Ave. Suite 100
Long Beach, CA 90806
(562) 427-4249 www.lbaca.org





The Long Beach Alliance for Children with Asthma



What is the Long Beach Alliance for Children with Asthma?

The Long Beach Alliance for Children with Asthma (LBACA), started in 1999, is a partnership to improve the lives of children with asthma in the Long Beach community. LBACA is one of 7 sites in the US and Puerto Rico awarded grants under the Robert Wood Johnson Foundation's *Allies Against Asthma* program, and one of 12 sites in California awarded grants under The California Endowment's *Community Action to Fight Asthma* (CAFA) Program. Focus is on the community of Long Beach as a whole and zip code 90813 - the most impacted area in the city where model programs will first be developed and tested.

What are the coalition's current activities?

LBACA's activities include a community health worker home visiting program, an asthma resource center, Physician Asthma Care Education training to improve physician asthma management skills and training medical assistants to provide asthma education to patients at provider sites. LBACA is also teaming up with schools, after-school programs, parks and recreational centers to develop asthma-friendly environments and policies; and mobilizing the community to respond to air quality issues, both indoors and outdoors.

What are the coalition's long-term objectives?

- 1) To change the profile of childhood asthma in the most affected areas of the City of Long Beach through improved healthcare delivery and quality, outreach, education, support systems, improved living environments and changes in policy at all levels.
- 2) To improve clinical outcomes including reduction in preventable hospitalizations, emergency room visits, and school absenteeism due to asthma, and enhanced quality of life measures.

Who is represented in the coalition?

Long Beach Memorial Medical Center; Miller Children's Hospital; The Children's Clinic; parents of children with asthma; community residents; the Long Beach Department of Health and Human Services; Miller Foundation; Long Beach Unified School District; Families in Good Health at St. Mary's Medical Center; Head Start; Healthy Connections; Greater Long Beach YMCA; American Lung Association of Los Angeles County; Partnership for the Public's Health; Universal Care; LA Care Health Plan; CSULB; USC; Community Partners Council; City of Long Beach Neighborhood Improvement Project and Dept of Parks and Recreation; Long Beach Press Telegram; State Assembly member Betty Karnette's Office; State Senator Alan Lowenthal's Office; City Council member Bonnie Lowenthal's Office; Apartment Association of CA Southern Cities; South Coast Air Quality Management District; Coalition for Clean Air; Sick of the Port; Physicians for Social Responsibility; CORAL After School Program; Legal Aid Foundation; Smokefree Apartment House Registry; Merck & Co.; and GlaxoSmithKline.

Funding and Support

LBACA is supported by The Robert Wood Johnson Foundation, The California Endowment, Johnson & Johnson, Miller Foundation, LA Care, Kaiser Permanente, the Josephine S. Gumbiner Foundation, Miller Children's Hospital and Long Beach Memorial Medical Center.

How can I contact LBACA?

If you'd like to join LBACA, or if you would like more information about us, please contact Elisa Nicholas, MD, MSPH, Project Director or Maura Dwyer, MPH, Project Coordinator at 562-427-4249.



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Asthma in Long Beach

- It is estimated that 15% of children in Long Beach have asthma (compared to 8% in LA County)
- Hospitalization rates for asthma are higher in Long Beach than in the rest of LA County and across CA:
 - 45 per 10,000 for ages 0-4 in Long Beach while in Los Angeles County and CA they are 32 (Healthy People 2010 goal is 25);
 - 17 per 10,000 in Long Beach for 5-18 year olds while in Los Angeles County and CA they are 12.6 and 10.9 respectively (and well above the Healthy People 2010 goal of 7.7)
- Asthma has been identified by nurses in the Long Beach Unified School District as the number one physical health problem among school aged children in the City of Long Beach and the leading cause for missed school days.
- Asthma remains the most prevalent diagnosis in admissions to the pediatric intensive care units at Miller Children's Hospital and St. Mary's Medical Center where hospital discharge data reflects a total of 1,144 hospital days and 1,418 emergency room visits due to asthma in 2003.

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LONG BEACH ALLIANCE FOR CHILDREN WITH ASTHMA



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Air Pollution and Asthma in Long Beach

According to the University of Southern California's Children's Health Study, which was conducted over 10 years in 12 communities with 6,000 children in southern California, **Long Beach** had

- **the highest levels of elemental carbon**, a marker for diesel exhaust, of all 12 communities (diesel exposure is associated with numerous immune system responses in humans and animals culminating in increased allergic inflammatory responses and suppression of infection fighting ability)
- **the third highest levels of nitrogen dioxide** (not only has a relationship been established between nitrogen dioxide exposure, respiratory tract symptoms and asthma exacerbation, but exposure to NO₂ has also been found to enhance allergic responses)
- **the fifth highest PM 2.5 exposure** (elevated levels of both ozone and particulate matter have been shown to increase missed school days and hospitalization rates)
- **6% of children tested in Long Beach have less than 80% of their normal lung function, compared to NO children with impaired lung function in Santa Maria.** Clinically significant lung function deficits predict future health problems and even premature death.
- Other key findings include:
 - **a decrease in lung growth** among children living in the more polluted communities
 - **new cases of asthma** in those children living in the more polluted communities who get the most exercise
 - **an increase in school absences** due to respiratory problems when the air pollution gets worse

Children are at risk from air pollution in two ways:

- **Children have greater exposure:** they breathe more air in relation to their body weight and lung size and they play outside more, with higher breathing rates.
- **Children have greater vulnerability:** their bodies are still developing and are more susceptible to irritation and illness.

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Housing and Asthma in Long Beach

These findings are based on a sample of 50 families enrolled in our Asthma Community Health (CHW) Worker Home Visiting Intervention. Families of children with poorly controlled asthma receive 3-5 home visits from a trained CHW. These families live in neighborhoods with significant housing code violations and asthma triggers present in most residences. The affordable housing crisis contributes even further to these residents' precarious housing situations. The Long Beach Housing Trust Fund Coalition estimates that at \$6.75 per hour, two full-time minimum wage workers would have to each work nearly 64 hours per week to afford the average 2 bedroom/1 bath rent. With vacancy rates in Long Beach at 3.7% (the lowest in LA County), families have nowhere to go. They live in very poor and overcrowded conditions because they are afraid of being forced out.

Living Conditions

- 43% of clients are living in overcrowded¹ conditions.
 - The average number of residents per home was 5.15.
 - Average number of children in each home was 2.89.
 - Average number of bedrooms in each home was 1.58.
 - Average number of rooms in each home was 4.54.

Housing Conditions

- 27% reported fear or anxiety about submitting a repair or remodeling request to a property owner.
- Of those respondents, 55% were anxious or fearful of eviction, 73% feared a rent increase, and 18% were afraid of the landlord.

Health Code Violations

- 53% of the homes had visible mold or mildew (49% of these children had their asthma exacerbated by mold or mildew in the home as reported by their parents).
- 47% of the homes had cockroaches.
- 26% of the homes had rodents.

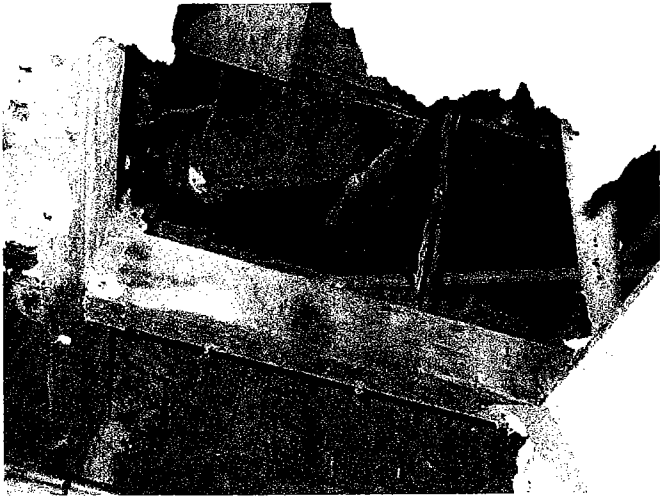
Notes

¹ Overcrowded defined as more than 3 persons in a 1 bedroom home or more than two persons for each bedroom.

² It may be best to cite the above health code violation data in lieu of the exacerbation data, especially for the cockroach and rodent data.

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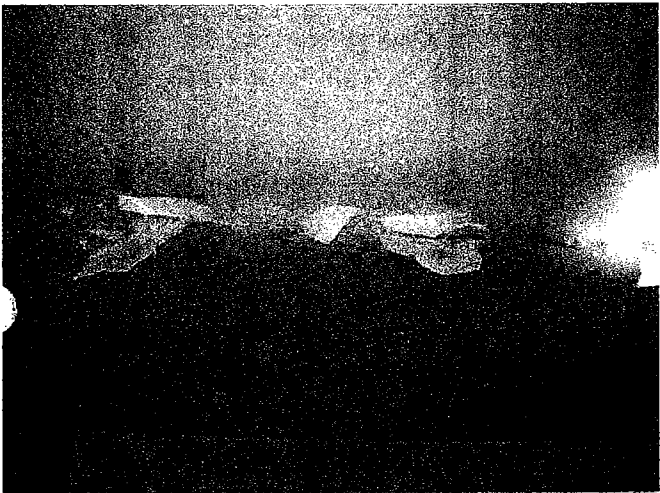
Housing and LBCA's Home Visiting Program



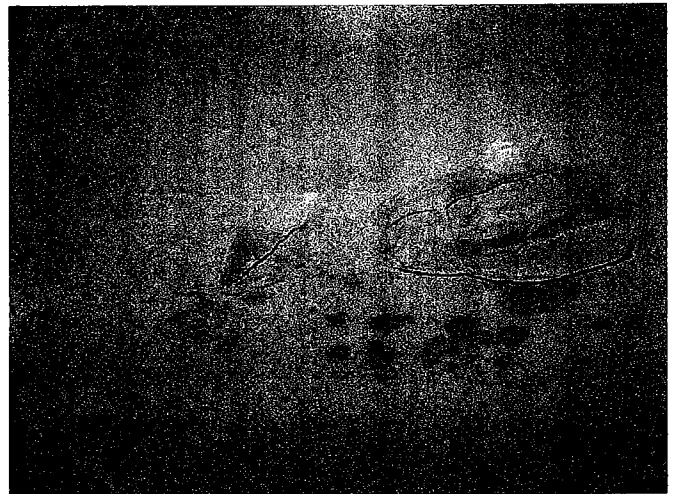
Laundry area below kitchen. Exposed wiring



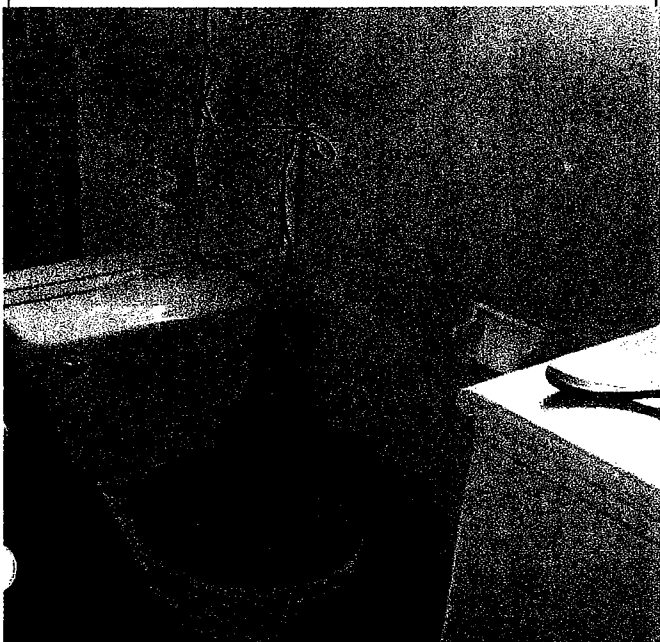
Peeling paint



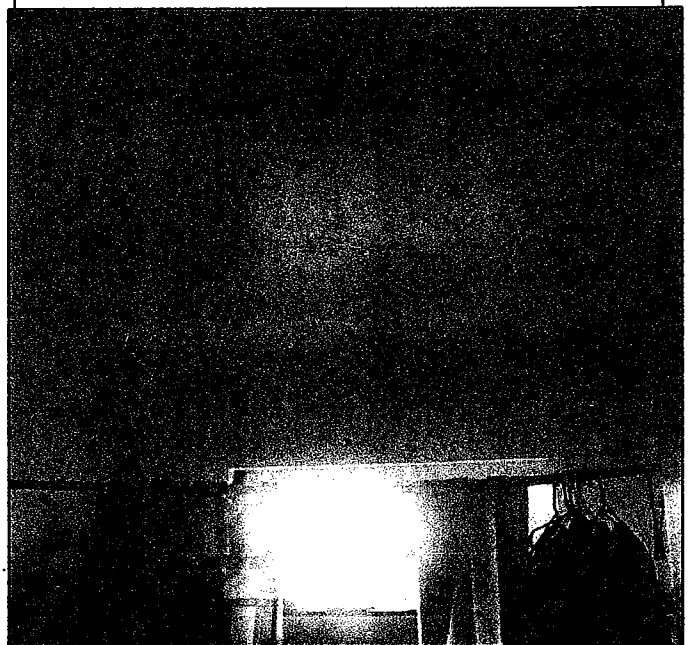
Mold and peeling paint (possible lead exposure)



Mold and peeling paint (possible lead exposure)



Mold and peeling paint (possible lead exposure)

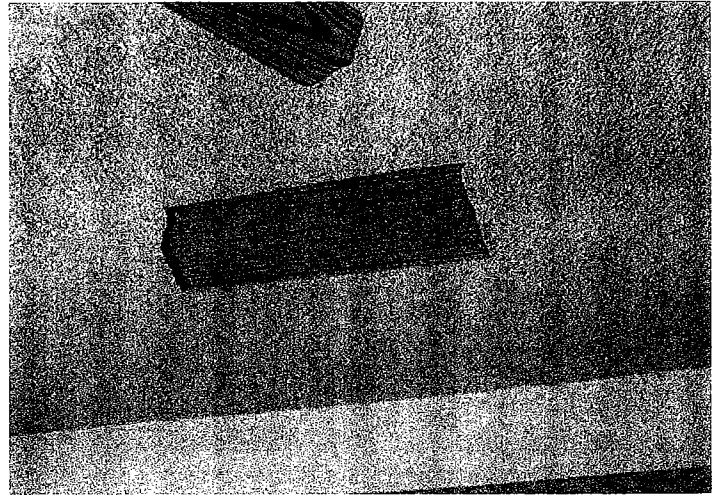


Mold

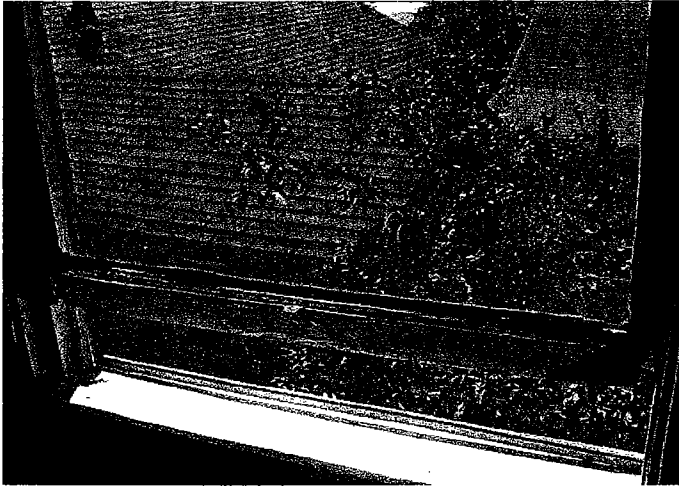
Housing and LBCA's Home Visiting Program



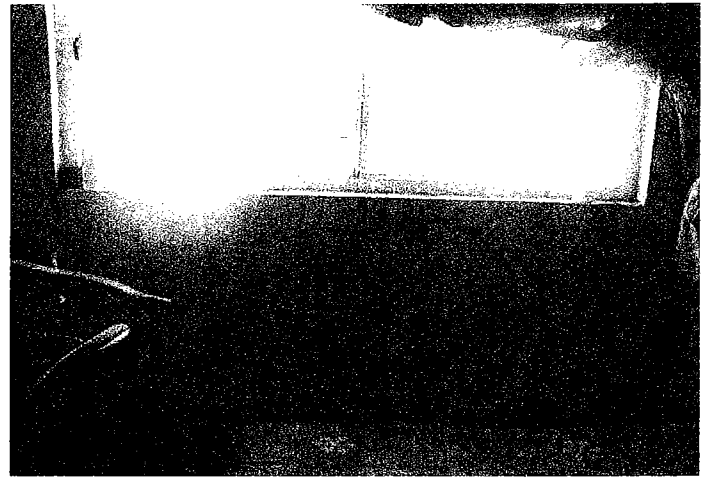
Mold, water damage



Exposed ceiling slats (possible asbestos exposure)



Chipped, peeling paint (possible lead exposure)



Mold and water damage



Mold and water damage. Defective sun floor covered with vinyl



Water damage, peeling paint and plaster

LBACA's Activities



Community Health Worker home visit, preparation of asthma gadget and medication



Asthma Wellness Fair



Parent asthma class



Asthma Wellness Fair



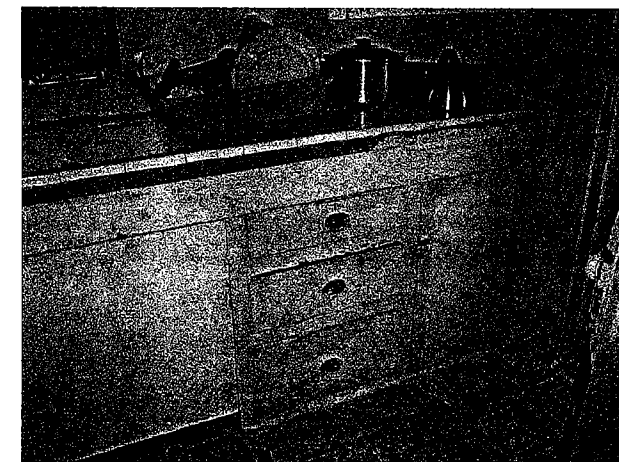
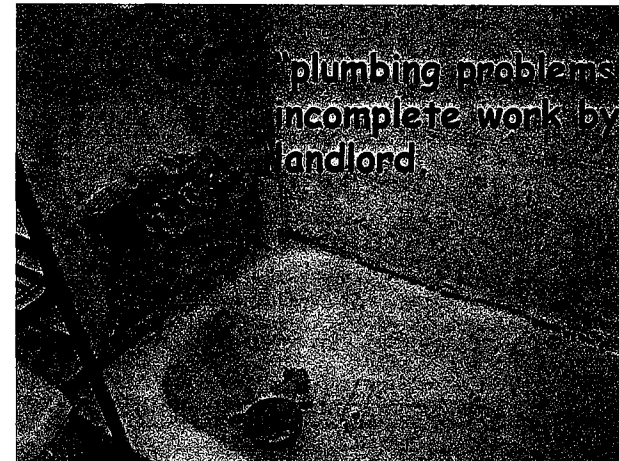
Teen with asthma testifying at hearing



Dr. Elisa Nicolas testifying at Long Beach City Council meeting

HEALTHY HOMES COLLABORATIVE

Housing Hazards and Health



HEALTHY HOMES COLLABORATIVE

Housing Hazards and Health



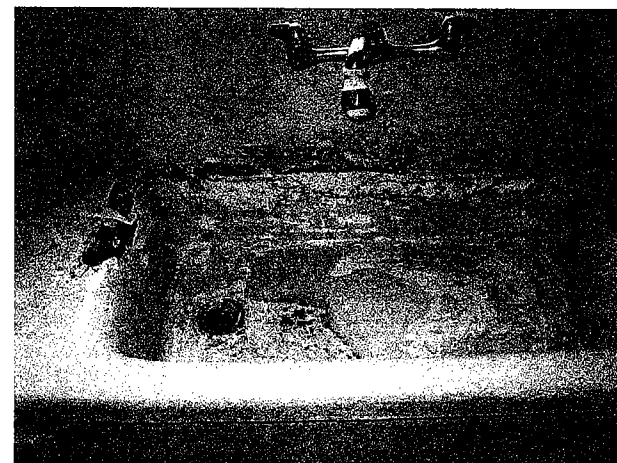
MOLD- tenants ceiling



MOLD- tenants bedroom



Cockroach Infestation



Tenants kitchen sink

HEALTHY HOMES COLLABORATIVE

Preliminary Findings from Home Health Hazard Assessments

Income

- 78% reported a monthly income of less than \$1,500 monthly or \$18,000 annually

Housing

- All 50 are tenants
- 80% are on month to month arrangements
- 62% live in housing built before 1979
- Only 9% reported having ever received information about lead hazards in their buildings

Reported Risks

- 92% chipping and peeling paint
- 86% moisture problems and mold
- 24% had water leaks on ceilings, walls or floors
- 46% had vermin infestations
- 84% had cockroach infestations

Health Issues

- 58% reported that least one of their children has a health problem
- 30% of the children have been diagnosed with Asthma
- 68% of mothers have no health insurance

Asthma in California

Asthma makes it hard for many of California's children to live, learn, and play.

- ▶ In California, about 1 in 10 of children under 18 years of age have been diagnosed with asthma and have had symptoms within the previous 12 months.¹ This is higher than rates found in the United States overall.² These figures likely underestimate the true prevalence of asthma.



HOSPITALIZATION

- ▶ Between 214 and 218 out of every 100,000 children under 15 are hospitalized each year in California because of asthma.³ This comes to over 15,000 hospitalizations per year.

DISABILITY

- ▶ Nationwide, disability due to asthma among children under 18 has increased by 232% over the past 3 decades. Disability from asthma has increased more than twice as fast as disability from other causes during this time.⁴ (Disability refers to substantial limitations in age-appropriate activities.)
- ▶ Asthma is now the most common cause of disability among children nationwide.⁵

SCHOOL ABSENTEEISM

- ▶ Nationwide, approximately 14 million school days are missed every year due to asthma, a rate of nearly 4 days per child with asthma per year. Around a quarter (23.6%) of children with asthma miss school some time during the year due to asthma.²

HEALTH DISPARITIES

- ▶ The hospitalization rate for asthma in California is more than three times higher for African American children than for other children.³
- ▶ Currently in California there are over half a million Latinos, including approximately 200,000 Latino children who suffer from asthma. Since Latinos are currently the state's fastest growing ethnic group and within the next 40 years they will account for the majority of Californians, the potential impact of asthma on California and this population is enormous.⁶
- ▶ Children in poor families are more likely to have been diagnosed with asthma than children in families who are not poor.⁷

ASTHMA COSTS CALIFORNIA LOTS OF MONEY.

- ▶ Asthma hospitalizations cost \$480 million in California in 2000.⁸
- ▶ The average cost per stay for asthma in California was \$13,000. Around one-third of these stays are paid through Medi-Cal.⁸

BAD ENVIRONMENTAL CONDITIONS MEAN MORE ASTHMA ATTACKS FOR ASTHMATIC CHILDREN.

We do not yet know how to cure asthma, but sick days, hospitalizations, and emergency room use are largely preventable. Prevention can be achieved through a combination of consistent health care, appropriate use of medications, and decreased exposure to environmental triggers which aggravate asthma symptoms.

Many environmental pollutants have been implicated in causing or worsening asthma, and new information is accumulating rapidly. Among these, the evidence is the most consistent for⁹⁻¹¹:

- ▶ Air pollution created from vehicular traffic, especially diesel traffic, and some industrial processes;
- ▶ Poorly maintained schools and substandard housing, which expose children to mold, dust, and cockroaches; and,
- ▶ Secondhand smoke from cigarettes.

Concern is also increasing about the role exposure to respiratory irritants and chemicals affecting the immune system may play in asthma, including¹²⁻¹³:

- ▶ Some cleaning products; and,
- ▶ Pesticides.

COMMUNITIES ACROSS CALIFORNIA ARE TAKING ACTION TO HELP OUR CHILDREN BREATHE EASIER.

Many communities face dilapidated schools, poor housing conditions, and outdoor air pollution from nearby industries and freeways. Families alone cannot initiate large-scale changes to improve their children's environments and reduce the frequency of their asthma attacks. There is a need to develop effective strategies to reduce asthma triggers through viable public policy.

Community Action to Fight Asthma is an initiative of 12 local coalitions, 4 regional centers, and a state coordinating office that addresses this need by advancing policies to reduce environmental triggers of asthma among school-aged children. Policies are selected, developed, and promoted by community members, based on their knowledge of local challenges and potential solutions.

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Asthma and Outdoor Air Quality

Outdoor air pollution is a serious problem in most urban areas as well as in many rural areas of the United States and California. In urban areas, the problem affects low-income and minority communities disproportionately because these groups tend to live in the areas where air pollution tends to be the worst. Every year, millions of pounds of dangerous chemicals, gases, and particles are released into the air by our vehicles, power plants, and factories. Air pollution can have long-term effects on our health and can contribute to the development of respiratory tract infections, asthma, and lung cancer. The incidence and prevalence of lung diseases such as these have been growing rapidly over the past decade.¹



WHERE DOES OUTDOOR AIR POLLUTION COME FROM AND WHAT HEALTH EFFECTS DOES IT PRODUCE?

Outdoor air pollution comes from the following sources:

- ▶ Point sources such as power plants, which produce sulfur dioxide (SO₂) or acid sulfate particles. Sulfur dioxide (SO₂) is formed by the burning of sulfur containing fuels such as coal and oil. Steel mills and pulp and paper mills are also sources of SO₂ pollution.

Health Impacts: Breathing problems and lung damage, especially for those with asthma, bronchitis, and emphysema.

- ▶ Area sources such as oil refineries or petrochemical industry facilities produce toxic and organic gases, which help to form ozone. Ozone air pollution forms when emissions from motor vehicles, power plants and industry react with sunlight.

Health Impacts: Ozone damages lung tissue and causes breathing problems, including asthma, coughing, sneezing, and chest pain. Ozone can suppress the body's immune system.

- ▶ Mobile sources such as cars, buses, and trucks with engines operated on gasoline or diesel fuel, and line sources such as freeways, produce particulates and nitrogen dioxide (NO₂).

- Particulates are tiny particles suspended in the air that, when inhaled, can cause lung damage. These tiny particles come from the burning of fuels or dust from construction, mining, and agricultural activities. The particles can also include dirt, soot, smoke, and even liquid droplets (aerosols) emitted from factory smokestacks and other sources.

Health Impacts: While the nose and mouth filter out larger particles, smaller particles are inhaled, causing lung damage, breathing problems, and triggering asthma.

- Nitrogen dioxide (NO₂) is a brownish, acidic gas that also reacts with other gases to form ozone. Fuel emissions from automobiles, trucks, and power plants are sources of NO₂.

Health Impacts: NO₂ irritates the lungs, causing bronchitis and pneumonia.

“After moving from Florida to the San Joaquin Valley, it didn't take long for me to realize how the change in air quality was affecting my six-year-old asthmatic son. While in Florida it had been nearly four years since he had experienced any asthma symptoms but within a month of living in Merced my son had to be rushed to the emergency room with the worst asthma attack he had ever had. It took nearly six hours for physicians and respiratory therapists to bring it under control.”

ALICIA BOHLKE
Program Manager
Merced/Mariposa County
Asthma Coalition

HOW DO OUTDOOR AIR POLLUTANTS RELATE TO CHILDHOOD ASTHMA?

Scientific studies conducted in California and throughout the U.S., as well as in other countries around the world, have found the following strong relationships between four outdoor air pollutants (NO₂^{2,20}, particles^{4, 6, 10, 13, 15-16, 22-45}, ozone^{5, 10, 13, 15-16, 25, 26, 28, 35, 39, 46-60}, and SO₂^{2, 5},

9, 11, 15, 31, 38, 56, 61-68) and asthma-related outcomes in young school children 2-14, 16-20, 22-29, 31-33, 35-36, 38-43, 45, 46-48, 50-54, 56-65, 69 and adolescents 2-4, 6-8, 10-11, 13, 16, 18-19, 27, 33, 35, 42, 46-49, 51, 54-55, 56-58, 64, 66-68 :

- Increased asthma prevalence;
- Asthma symptoms like wheezing, coughing, and decreased lung function measures;
- Increased medication use for asthma, such as rescue inhalers;
- Increased number of doctor's office and emergency room visits for asthma; and,
- Increased number of school absences.

For example, the University of Southern California's long-term study of over 3,000 children in 12 southern California communities has reported statistically significant relationships between:

- Ozone and decreased lung function measures. ¹⁰
- NO₂ with increased wheezing ³⁶ and phlegm.³⁵
- NO₂ and particles with increased bronchitis symptoms.^{6, 46}

In addition, the study has found that children playing three or more team sports in high ozone areas have an increased risk for newly diagnosed asthma.⁴⁸

WHAT CAN YOU DO ABOUT OUTDOOR AIR POLLUTION?

CAFA coalitions and regional centers are working to promote interventions and policies to improve the lives of children with asthma. A few examples of local CAFA policy and program efforts include:

- ▶ Training asthma community advocates so they can better participate in air regulatory meetings and support changes.
- ▶ Supporting regulations that reduce diesel emissions in vehicles exempted from state regulations (for example, locomotives).
- ▶ Reducing idling of diesel-fueled vehicles that lead to releases in places near homes and schools.
- ▶ Partnering with Air Quality Management Districts to alert the public to the highly toxic chemicals and particulate matter released by burning wood and trash, and working towards the passage of city ordinances to reduce open burnings.

For helpful resources and information on how you can take action in your community, go to Community Action to Fight Asthma's website at <http://www.calasthma.org>.

SELECTED REFERENCES (for complete list go to <http://www.calasthma.org>)

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Asthma and Indoor Air Quality in the Home

On average, adults and children spend 90% of their time during the week indoors and the majority of this time in the home. Children can be exposed to many asthma triggers in their homes. The presence of uncontrolled environmental triggers causes irritation to the lungs and can lead to asthma, allergies and other health threatening conditions. Triggers in the home include:

MOLD

Mold spores and bacteria, which are found either in air, in settled dust, on surfaces, or behind walls have been significantly associated with increased prevalence of respiratory symptoms and decreased lung function among asthmatic children.¹⁻¹⁹ Mold and bacteria problems are at their worst in certain conditions, such as when there is moisture damage or higher indoor relative humidity.

COCKROACHES AND RODENTS

Cockroach and rodent (mouse, rat) allergens in kitchens and bedrooms have been linked to increased asthma symptom prevalence and severity among children who are sensitized.²⁰⁻³⁹ Intervention studies have demonstrated professional cleaning and bait traps reduced measured levels of these pest allergens.⁴⁰

DUST MITES

Dust mites, especially when there is inadequate ventilation and higher relative humidity, have been consistently associated with both allergic sensitization and increased asthma symptom prevalence and severity among children who are already sensitized.^{27, 29, 41-58} Intervention studies have shown dust mite allergen levels are reduced by polyurethane-coated covers on mattresses, quilts, and pillows as well as the removal of carpets and rugs.^{54, 59-74}

PETS

Pet allergens, such as from dogs and cats, can collect in dust on smooth floors, upholstered furniture, and especially on carpets or rugs. Some studies have reported significant associations between pets and asthma symptoms,^{27, 30, 55-56, 75-84} but others have not.^{34, 75, 82, 85-90} Intervention studies have reported some air filtration devices and removal of carpet or rugs reduced levels of pet allergens in the home.^{72, 91}

GAS STOVES AND SPACE HEATERS

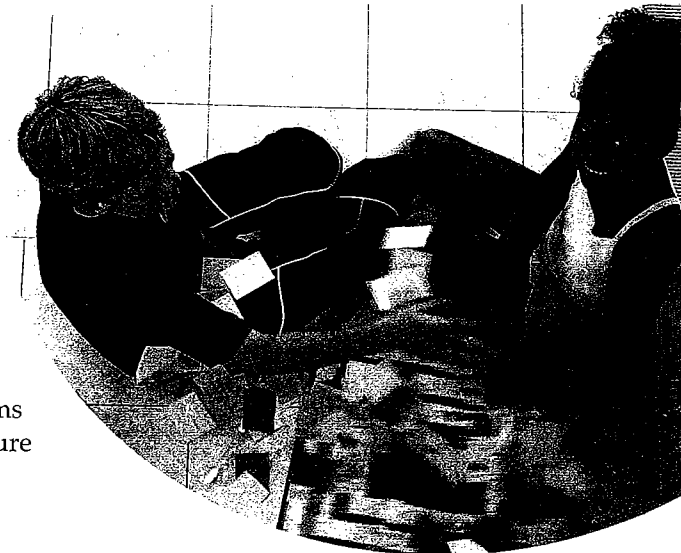
Indoors, nitrogen dioxide (NO₂), which can be emitted from unvented, improperly operating gas-fired stoves and space heaters, has been shown to increase allergic sensitization and susceptibility to asthma attacks.⁹²⁻⁹⁶

TOBACCO SMOKE

Tobacco smoke has consistently been shown to increase both allergic sensitization and subsequent asthma attacks, including when there was prenatal smoking by the mother.^{1, 8-9, 27, 83, 97-106} Environmental tobacco smoke, or secondhand or passive smoke, is produced when individuals use tobacco products inside the home or too close to open doors and windows.

POLLEN

Pollens from trees, grass, buckwheat and flowers have been shown to increase the prevalence of asthma symptoms in children with asthma in some studies.¹⁰⁷⁻¹³⁰ Pollens enter the home from outside through windows, doors and possibly ventilation systems with inadequate particle filtration.



“I have many patients who suffer from asthma where I know that the indoor air pollution triggers are the main cause. These tend to be the toughest cases to treat because no matter how much medicine we give them, with continued exposure to triggers, the lungs just close down.

“I had a striking patient two weeks ago, whose physical exam sounded just horrible despite taking her medications correctly. I asked her mom about indoor air issues. When I asked about mold she said, ‘I pulled the couch away from the wall the other day and the wall was covered with black mold. Does that have anything to do with her asthma? Everything in our house is damp – even my clothes in my closet are never totally dry. I’ve told the landlord about it before, but he doesn’t do anything.’”

LISA CHAMBERLAIN
Stanford Medical Center

WHAT CAN BE DONE ABOUT ENVIRONMENTAL TRIGGERS IN THE HOME?

CAFA coalitions and regional centers are working to promote interventions and policies to improve the lives of children with asthma. These efforts are targeted to the needs of their communities. Local coalition membership includes parents, health care providers, school personnel, environmental justice organizations, tenant organizations, local residents and others concerned about asthma. A few examples of local CAFA policy and program efforts include:

- ▶ Advocating for policies and programs that hire community health workers (CHW) to identify asthma triggers in homes and connect residents with resources. CHWs educate and serve other members of their community by increasing their capacity to reduce and prevent environmental triggers, and better manage asthma. They provide families with skills and tools to reduce those environmental triggers within their control, like using bait traps to reduce levels of pest allergens and using polyurethane-coated covers on mattresses, quilts, and pillows to reduce dust mites.
- ▶ Advocating for tenants' rights in poor quality housing. It is the responsibility of both residents and property owners to take steps to remove environmental triggers that may lead to asthma and poor health in residential housing. Community groups and CHWs advocate for changes that must be made by landlords, such as removing carpet to reduce dust mites or fixing leaks to reduce mold.

For helpful resources and information on how you can take action in your community, go to Community Action to Fight Asthma's website at <http://www.calasthma.org>.

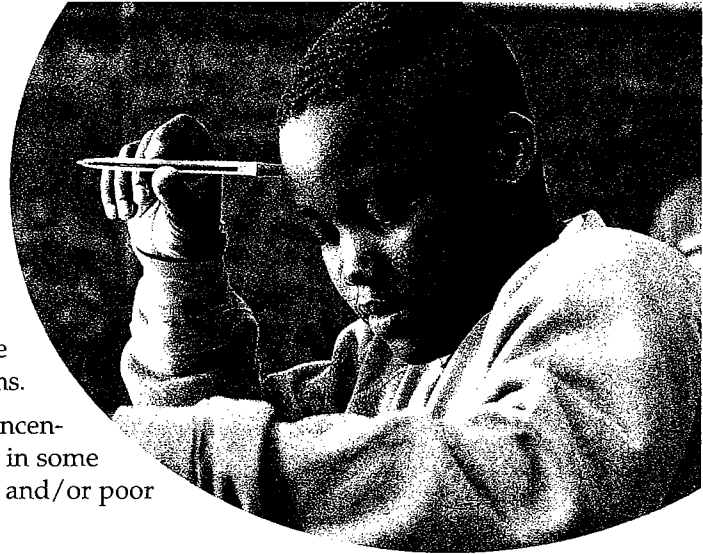
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Asthma and Indoor Air Quality in Schools

WHY SHOULD WE BE CONCERNED ABOUT INDOOR AIR AND ENVIRONMENTAL QUALITY IN OUR SCHOOLS?

- ▶ Approximately 1 in 5 Americans work or are in school facilities 6-8 hours every day.
- ▶ Asthma is the number one cause of school absences due to chronic disease in the U.S.¹³
- ▶ Many schools across the country and in California have been found to have poor indoor air and environmental quality.^{4,14}
- ▶ Studies in California^{14,18} and elsewhere (e.g.,^{19,20}) have documented the widespread prevalence of inadequate ventilation in school classrooms.
- ▶ Recent studies throughout California found there were high air concentrations of formaldehyde and volatile organic compounds (VOCs) in some traditional and portable classrooms due to various indoor sources and/or poor ventilation.^{14,17, 21-24}



WHAT ARE THE MAJOR SCHOOL INDOOR AIR QUALITY PROBLEMS FOR CHILDREN WITH ASTHMA?

Research from around the U.S. and other countries have connected poor indoor air quality in schools to health problems, including asthma.⁸⁻¹²

DUST

Dust in schools has been associated with statistically significant increases in allergic sensitization, incidence of asthma diagnosis, prevalence of asthmatic symptoms, and asthma medication use.^{25,40} Dust in schools is found on surfaces like bookcases and smooth flooring, and in carpets, rugs, curtains, and upholstered furniture. Carpets and rugs tend to increase air quality problems – studies have reported allergen levels in dust were higher in carpets and rugs than on smooth floors.^{25, 39}

VENTILATION

One study documented health benefits from replacing and upgrading ventilation systems. Twelve schools replaced or upgraded their ventilation systems, while 88 schools did not. Before those 12 schools improved their ventilation systems, rates of asthma were comparable in both groups of schools. Two years later, among children completing surveys, the 12 schools with improved ventilation systems had fewer children reporting asthmatic symptoms compared to the other schools⁴¹

FINISHES, FURNISHINGS, AND CLEANING AND TEACHING PRODUCTS

Volatile organic compounds, or VOCs, are respiratory irritants emitted into the air by building and interior finish materials, furnishings, and cleaning and teaching products. One study reported there were more students with current asthma in school classrooms with higher concentrations of formaldehyde or other VOCs.³⁶ Other studies have reported VOCs in outdoor air were related to the prevalence of asthma symptoms in school children.^{42,44}

MOISTURE AND MOLD

Mold, bacteria and dampness on surfaces or damaged materials have been significantly associated with prevalence of wheezing and/or cough and development of allergy.^{45,46} Moisture-related problems can result from leaks under sinks, in roofs, and under floors or behind walls.

- ▶ Researchers found three times as many students were diagnosed with asthma over a three-year period after a school suffered serious moisture damage when compared to the three-year period prior to the damage.⁴⁷
- ▶ In one study comparing moisture-damaged schools with a control school from the same area, 8 of 9 children diagnosed with asthma (133 children were in the study) were from the moisture-damaged schools.⁴⁸

“I have practiced as a school nurse for 37 years in San Francisco...and I know that asthma is on the increase. I used to see 5 or 6 kids with asthma a year and now I see 10-35% of the children in the schools where I work....The increase has got to be related to the air we are breathing indoors and outdoors....To effectively treat asthma, a healthy environment is as important as having the right medication.”

MARIE HOEMKE
Active Member
San Francisco Task Force

- ▶ In another study, schools with higher measured air concentrations of mold or bacteria in classrooms had more students who reported current asthma.³⁶

PESTICIDES

To date, few studies have investigated the link between pesticides and children with asthma. However, a growing consensus has developed over the last several years among health and school professionals, public and community health advocates, and even many legislators, that school pesticide use can affect children's health. Given what is known about the health risks of pesticides – for example, exposure can harm the nervous system – and concern about how pesticides may affect asthmatic children, many advocates are promoting the use of less toxic or nontoxic alternatives at schools.

WHAT CAN YOU DO?

CAFA coalitions and Regional Centers are working to promote interventions and policies to improve the lives of children with asthma. These efforts are targeted to the needs of their communities. Local coalition membership includes parents, health care providers, school personnel, environmental justice organizations, tenant organizations, local residents and others concerned about asthma.

A few examples of local CAFA policy and program efforts on indoor air quality in schools:

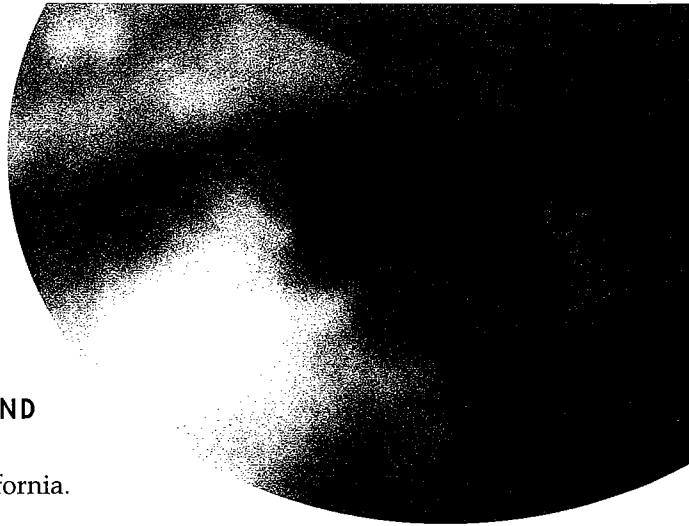
- ▶ Reducing children's exposure to environmental triggers in schools by expanding the number of schools using the U.S. EPA "Tools for Schools" program and other no-cost or low-cost indoor air quality protocols.
- ▶ Reducing children's environmental health risks to exposures in schools by expanding and encouraging consideration of children's environmental health in the design and construction of new schools as well as during school renovations.
- ▶ Reducing exposure to outdoor air pollution by disseminating air quality forecasting information through the use of "flag policies." In this way, schools take action to protect children's health and minimize their exposure to ozone and particulates on poor air quality days.
- ▶ Reducing the use of pesticides in schools by encouraging and supporting Integrated Pest Management programs, which use the least toxic chemicals in conjunction with non-chemical techniques to control pests and eliminate pest pathways inside and outside schools.
- ▶ Providing information on the relationship between pollen-producing plants and childhood asthma.

For helpful resources and information on how you can take action in your community, go to Community Action to Fight Asthma's website at <http://www.calasthma.org>.

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Asthma and Diesel



WHAT EXACTLY IS IN DIESEL EXHAUST?

- ▶ Diesel exhaust generates diesel exhaust particulate (DEP). DEP is emitted by trucks, school buses, older cars and off-road construction and industrial equipment with engines running on diesel fuel.^{1,2}
- ▶ DEP is a mixture of hundreds of compounds, some of which are gases while others form parts of tiny particles suspended in the air called particulate matter.
- ▶ Diesel exhaust also contributes to the formation of ozone.

WHY SHOULD WE BE CONCERNED ABOUT DIESEL EXHAUST AND HOW IS IT LINKED TO ASTHMA?

The health risks of diesel exhaust are recognized by the State of California.

- ▶ California has formally recognized diesel exhaust particulate (DEP) as a toxic air contaminant which is subject to regulation to lessen emissions and reduce human exposure.
- ▶ In 2001, the Office of Environmental Health Hazard Assessment, under the "Children's Environmental Health Protection Act" of 1999 (SB 25, M. Escutia), determined one of the "top 5" outdoor air pollutants of concern to children's health is diesel exhaust particulate.³

Many of the compounds in diesel exhaust are known to cause cancer and are increasingly implicated in asthma as well.^{2,4,8} Studies of diesel exhaust have uncovered a variety of disturbing biological effects directly related to asthma:

- ▶ Exposure to DEP can disrupt the regulation of the immune system, which increases a sensitive person's risk of having allergic reactions to other things in their environment.⁹
- ▶ Laboratory animals and human volunteers exposed to DEP developed asthma-like inflammation in their air passages.⁹
- ▶ Particulates and ozone from traffic causes cellular damage directly to the lung lining, as well as through inflammation.^{10,11}
- ▶ Children are highly vulnerable to the health risks from diesel exposure. It is well known that children raised in heavily polluted areas face the prospect of reduced lung capacity and prematurely aged lungs.
- ▶ Fine particulates can penetrate children's narrow airways and lodge deep within the lung, where they are more likely to be retained and absorbed.
- ▶ Children also have higher respiration rates than adults, which can increase their exposure to air pollutants per unit of body weight.

THE FOLLOWING RESEARCH DEMONSTRATES THE IMPACT ON OUR CHILDREN:

- ▶ A study of about 6,000 low-income asthmatic children in San Diego found that asthmatic children living close to high-traffic areas made more doctor visits than those who lived further from traffic. Children living near high traffic areas (nearest freeway or major road) were more likely to have made two or more doctor visits for asthma than those who did not live near high density traffic areas.¹²
- ▶ Another study found that doctor-diagnosed asthma was more prevalent among children living within 100 meters (125 feet) of a freeway. The study also found that children living and attending schools closer to freeways and areas of high truck traffic had more chronic respiratory symptoms (coughing and wheezing) and doctor-diagnosed asthma than those who did not.¹³ In California in 2000, 173 K-12 public schools, with an enrollment over 150,000, were located within 500 feet of high-traffic roadways (>50000 vehicles per day).¹⁴
- ▶ A study done in Atlanta, Georgia, during the 1996 Summer Olympic Games found reduced traffic in the downtown area, due to altered traffic patterns and reduced traffic

"There is a family [where] all three of them have asthma and they feel like they're prisoners in their own home. The grandmother and two grandsons have asthma and they're literally four houses from the 710 freeway and two houses away from the train yards. To see two young boys who are not able to go outside and play and engage in sports because they will have an asthma attack that will hospitalize them [is sad]. It's affecting their schoolwork, their grades, and their existence. Their asthma is a major problem."

ANGELO LOGAN
East Yard Communities for Environmental Justice

density, reduced asthma hospitalizations. Children reported fewer recorded doctor visits and hospitalizations for asthma during the games compared to four weeks before and after the Olympic Games.¹⁵

WHAT CAN WE DO TO CLEAN UP DIESEL ENGINES AND REDUCE POTENTIAL EXPOSURES TO TRAFFIC-RELATED EMISSIONS IN OUR COMMUNITIES?

CAFA coalitions and Regional Centers are working to promote interventions and policies to improve the lives of children with asthma. These efforts are targeted to the needs of their communities. Local coalition membership includes parents, health care providers, school personnel, environmental justice organizations, tenant organizations, local residents and others concerned about asthma.

A few examples of local CAFA policy and program efforts include:

- ▶ Fighting the expansion of a freeway that would increase local air pollution.
- ▶ Raising awareness and taking action to reduce local sources of outdoor air pollution.
- ▶ Reducing children's exposure to hazardous diesel pollution by working with school districts, school boards, officials, associations and other groups to develop and implement policies regarding school bus idling.¹⁶

For helpful resources and information on how you can take action in your community, go to CAFA's website at <http://www.calasthma.org>.

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Frequently Asked Questions

WHAT IS ASTHMA?

Asthma is a chronic disease characterized by (a) ongoing inflammation in the lungs (meaning excess mucous and tissue swelling) and (b) episodes in which the small airways of the lung undergo spasms and tighten up (an "asthma attack"). Mostly, the inflammation continues unnoticed by the person with asthma. Asthma attacks, however, can range in severity from inconvenient to life threatening.

Scientists continue to argue about what causes asthma, although it's clear that many factors, including genes, allergies, and environmental pollution, play a role. Asthma attacks are often triggered by exposures to allergens, such as animal hair, pollen, and mold, or respiratory irritants, such as air pollution and some chemicals. Why a child with asthma reacts in this way while another child may be unaffected is unclear, but it is convenient to think of asthma as a disruption of the development of the immune system, specifically that part of the immune system that deals with allergies and reactions to environmental stimuli.



WHY IS ASTHMA ON THE RISE?

Measuring trends in asthma over time can be confusing, because one is never sure if the way we are defining the disease today is the same way people defined it 10 years ago. It's also clear that we are more aware of asthma today than we used to be, which probably means that we're more apt to recognize it when we see it.

In spite of this difficulty, studies suggesting that asthma is rising dramatically are surprisingly consistent. Also, some indicators of asthma that we see increasing, such as the number of deaths due to asthma per year, are pretty hard to mistake.

Debate rages on why asthma is increasing the way it is in so many industrialized countries and why children in low-income families and African American children suffer disproportionately from asthma. While some pollutants in the environment have been decreasing over the past decade, a great many more have been increasing. Lifestyles are also constantly changing and our exposures to everything from indoor air to pollution to exercise are constantly in flux.

WHY DOES ASTHMA DISPROPORTIONATELY IMPACT LOW-INCOME, URBAN COMMUNITIES AND COMMUNITIES OF COLOR?

Although asthma affects Americans of all ages, races, and ethnic groups, low-income and minority populations experience substantially higher rates of fatalities, hospital admissions, and emergency room visits due to asthma. Nationwide, African American children are 5 times more likely to die from asthma than white children.¹ The hospitalization rate for asthma in California is more than 3 times higher for African American children than for white children.^{2,3} In California, Latino children are hospitalized for asthma at a rate that is 10% greater than for white children.⁴ Urban neighborhoods throughout the U.S., including some in California, which are predominately low-income communities of color, have higher hospitalization rates for asthma than neighboring suburban and/or rural communities.⁵ Explanations for these disparities are not clear. Although some genetic factors contribute to these disparities, we also know environmental, economic, and social aspects contribute. These include:

- ▶ Geographical concentration in areas with poor air quality;
- ▶ Poverty, which systematically increases exposure to causes and triggers;
- ▶ Poor housing and school conditions, creating indoor environmental problems;

- ▶ Limited access to health care;
- ▶ Inadequate health insurance;
- ▶ Lack of culturally and linguistically appropriate asthma education programs; and
- ▶ Schools with poor indoor air quality

The elimination of health disparities is possible. We must work together to build a common vision for solutions at the community, state and national level to reduce the burden of asthma on our most vulnerable populations.

IS ASTHMA INCREASING BECAUSE WE'RE TOO OBSESSED WITH HYGIENE?

Some studies have turned out to be quite provocative, showing that children with older siblings or those who attend daycare are less likely to develop asthma. The idea is that exposure to some common viruses and bacteria, when occurring early in life, may tweak the development of the immune system in a beneficial way.⁶

This finding reminds us that our bodies develop in constant interaction with our environment and that exposure to microbes can be beneficial. For example, we have long known that many strains of bacteria live in the human large intestine and that without early exposure to these bacteria (which happens naturally), the intestine doesn't develop properly. Similarly, other bacteria serve to protect children (and adults) from urinary tract infections.

Some concern has been raised that the increasing number of people with asthma is the result of keeping children "too clean," but this would be very difficult to prove. Also, this explanation would fail to account for why some social groups suffer more from asthma than others. Although these findings don't explain the increase in asthma, they do provide an important reminder that germs are a normal part of life and we are probably causing problems by using antibiotics as much as we do, an idea that has long been argued by scientists.

WHAT CAN YOU DO?

Families alone cannot initiate large-scale changes to improve their children's environments and reduce the frequency of their asthma attacks. Yet we know that prevention can be achieved through a combination of consistent health care and decreased exposure to environmental triggers which fan the flames of asthma.

For helpful resources and information on how you can take action in your community, go to Community Action to Fight Asthma's website at <http://www.calasthma.org>.

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6. McGready SJ, 2004. Immunocompetence and Allergy. *Pediatrics*, 113: 1107-1113.

Quotes

WHAT ARE HEALTHCARE PROVIDERS AND RESEARCHERS SAYING ABOUT ASTHMA?

"It takes a protracted, community wide effort involving a spectrum of strategies to eliminate health disparities in asthma. But it can be accomplished."

WENDEL BRUNNER, PHD, MD
Director of Public Health
Contra Costa Health Services

"When I first started practicing, asthma was our most common admission. Now with programs focusing on environmental awareness and patient and parent education combined with improved physician education, I can see our admissions dropping. Children and families now know how to control their asthma and improve their environment to decrease their triggers. A coalition approach can truly make a difference...a difference in a child's life, a family's life, and the lives of those who care for them."

ELISA NICHOLAS, MD, MSPH
Executive Director
The Children's Clinic
Long Beach, CA

"Every year about 100 kids go off to SCAMP Camp here in San Diego and parents give us information in the camp application about how the child's asthma is affecting their lives (ER visits, school days missed, sleep disturbance, etc).

"We learned from the recent set of applications, that these children are waking up, on the average, 2.6 nights per week due to their asthma!! One mother reported their child was waking up 8 nights per week!! (boy- does that tell you how sleep deprived that mother must feel). Since parents are likely waking up at the same time their child is, imagine the number of 'tired-feeling' days both the child and parent are experiencing on a regular basis."

MICHAEL WELCH, MD
Co-Director
Allergy and Asthma Medical Group and Research Center
San Diego, CA
Previous Medical Director
SCAMP Camp, ALASDIC

WHAT ARE LOCAL COALITIONS SAYING ABOUT ASTHMA?

"Asthma has reached epidemic proportions in California. It's the leading cause of school absenteeism, affecting 700,000 children each year. The health community must be a strong advocate for cleaning up the state's air indoor and out, and move forward with a policy agenda that focuses on prevention."

JOHANNA CONGLETON
Public Health Associate Physicians for Social Responsibility-Los Angeles

"I work with children who have asthma. The problem is that our children are sick with asthma. These children very often have an emergency due to houses that are not in good condition. We find mold, we find cockroaches and even sometimes rats. This is grave because our children are getting sick, and many times it would be cheaper if [instead] of paying for the emergency room the [land-



lords] would clean the house."

MARIA BEJARANO
Asthma Project Health
Promoter with Coalition for Community Health

"Poor air quality is a huge issue in the San Joaquin Valley and one that political leaders can't escape. Five valley counties are among the 10 most ozone-polluted in the nation, and in fact, the people in the valley breathe in air pollution over an 8-hour period of time on more days than anywhere in the country, even L.A. So, I don't think it's a coincidence that our asthma rates are more than double the national average."

MARY-MICHAL RAWLING
Environmental Specialist
Merced/Mariposa County Asthma Coalition

WHAT ARE PARENTS SAYING ABOUT ASTHMA?

"It makes me feel like I don't have control of my body. And [it's] [disconcerting] because I know that this loss of control comes from products and pollution that are made for profit without concern [for] the general community."

"Part of what I don't like about having asthma is that I enjoy [the] outdoors. I'm a very active person. I enjoy exercise and being outdoors. But I feel like something's been taken away from me when I have an asthma attack. Because I actually do a lot less, I actually do curtail my habits because I'm afraid to have an asthma attack. I usually exercise by myself because I don't want to slow other people down when I have an attack. Most of my friends ride bikes and I don't really want to ride with them because it's embarrassing when everybody has to wait for me and they don't understand that it's not because I'm weak or out of shape, but it's because of my medical condition: asthma."

CANDICE KIM
Woman with asthma
Los Angeles, CA

"My daughter has severe asthma. She was diagnosed with chronic asthma 10 years ago and it has been a constant battle with this disease. Despite this challenge she is an athlete, an honor student but it has been a struggle with having to miss school and practice, when she is at her worst. We currently live in a rural section of

Imperial County where fields are burned to prepare for the planting of new crops. The last time the fields were burned near my home, my daughter and I had to leave our house because the smoke was so bad she was having trouble breathing.”

VIVIAN PEREZ

Imperial County, CA

“In my house, there’s mold. As much as I clean it, because the landlord says it’s my responsibility. My son suffers from allergies and asthma. With the mold, it starts to affect his allergies. Then his asthma attacks start and I have to take him to the emergency room. He now has health insurance, but he didn’t have it before. I had to give him home remedies because I was afraid I couldn’t pay for the emergency room bills.”

NORMA

Parent of child with asthma at CAFA media training in Los Angeles

“There’s many asthmatic children and I’m a mother with an asthmatic child. We live in a [house] that is old, and we need a law that makes landlords provide houses that are cleaner. That the paint doesn’t have lead, that they change the carpet, that there’s no mold, and to do all the necessary repairs because in my house there’s mold.”

MARIA CONSUELO

Parent of child with asthma at CAFA media training in Los Angeles

UNIVERSITY OF SOUTHERN CALIFORNIA URBAN INITIATIVE

Road To An Unhealthy Future For Southern California's Children

Andrea M. Hricko



URBAN
POLICY
BRIEF

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ROAD TO AN UNHEALTHY FUTURE FOR SOUTHERN CALIFORNIA'S CHILDREN

Andrea M. Hricko^{1,2}

URBAN INITIATIVE POLICY BRIEF

Reporting on results of a USC study of air pollution's impacts on children and some policy issues this study raises.

For more than 10 years, investigators at the Keck School of Medicine of USC have studied air pollution to determine its effects on children. Results from the USC Children's Health Study (CHS) show that children in Southern California's more-polluted communities suffer reduced growth of lung function, asthma exacerbations, more school absences, and new onset asthma. Many of the effects are linked to pollution from mobile sources — cars, trucks, ships, planes, trains, and other gasoline- and diesel-powered equipment. Significant strides have been made in past decades to implement emission control strategies, but the number of mobile sources keeps increasing and smog levels have started to rise again over the past five years. Increasing pollution may be compounded by regulatory delays because the federal government has just postponed deadlines to clean the air from 2010 to 2021.

Based on this evidence, this policy brief reviews the CHS results and examines the number of children who may be impacted by delays in controlling air pollution and the geographic areas with the highest pollution levels. It also

discusses the difficulty local air regulators have in protecting the region's interests in clean air against conflicting global and federal priorities. Finally, this brief considers regulatory measures to protect children's health by using available technology to reduce mobile source pollution as well as policy and planning solutions aimed at placing a higher priority on health when key development decisions are made.

Air pollution harms children's health

In 1993, USC investigators began enrolling 6,000 children from 12 communities in the CHS to determine whether long-term exposure to outdoor air pollution affected respiratory health. A decade later, the CHS has generated compelling evidence that the lungs of children living in

¹Andrea M. Hricko, MPH, is Director, Community Outreach and Education, Southern California Environmental Health Sciences Center (SCEHSC), and Associate Professor, Department of Preventive Medicine, Keck School of Medicine of USC. The SCEHSC and the Children's Health Study are both directed by John M. Peters, M.D., Hastings Professor at the Keck School of Medicine.

²With thanks to the other authors of "Breathless in Los Angeles," described below, and to Michael Jerrett and Jim Gauderman (reviewers) and Amy Tam (manuscript assistance).

FIGURE 1:

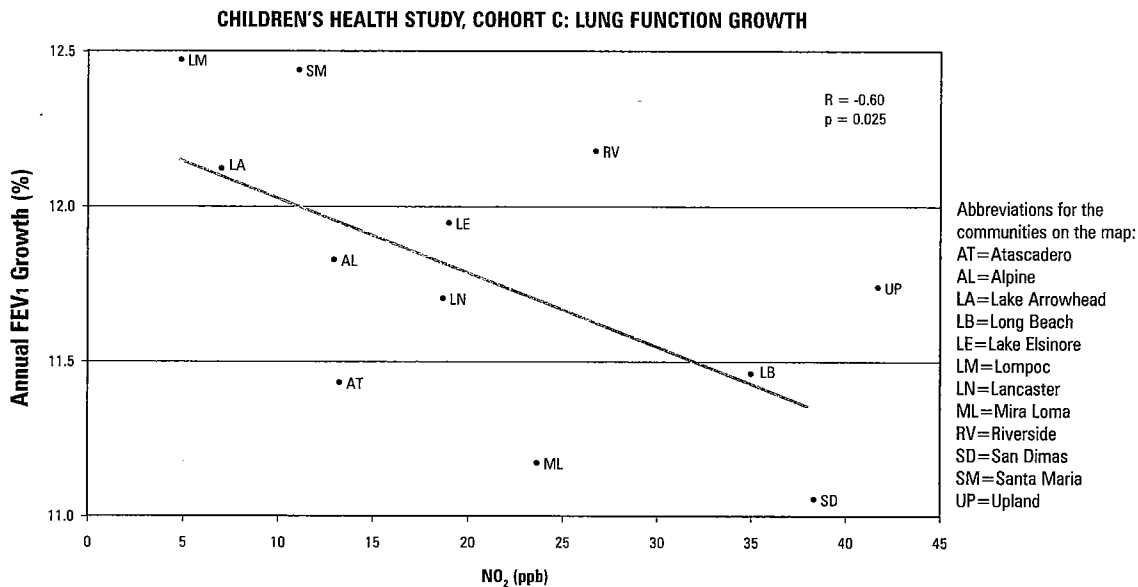
KEY RESULTS OF THE USC CHILDREN'S HEALTH STUDY

Children in the more-polluted communities have:

- ▶ Reduced lung function growth (their lungs grow more slowly)
- ▶ Improvement in lung function if they move to a less polluted community
- ▶ More school absences from acute respiratory problems when ozone levels go up
- ▶ Asthma exacerbation (in areas with more traffic-related pollutants)
- ▶ More cases of newly diagnosed asthma (in areas with high ozone levels)

FIGURE 2:

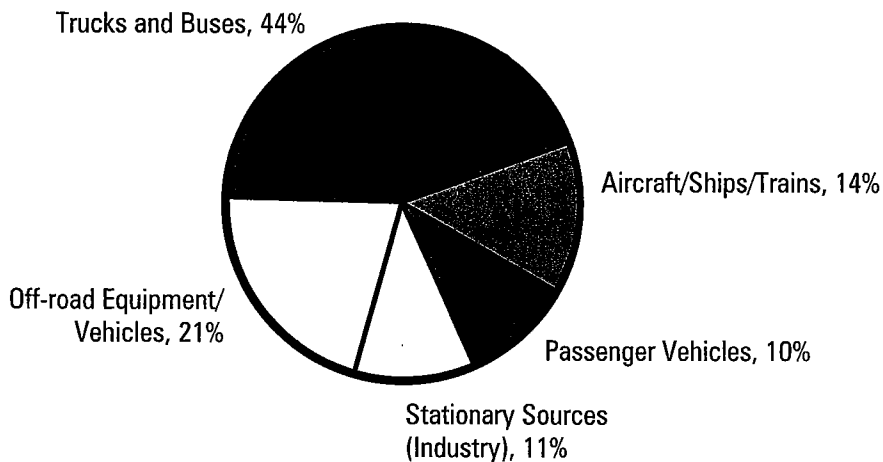
GROWTH OF LUNG FUNCTION DECREASES AS TRAFFIC-RELATED AIR POLLUTION INCREASES



Source: Children's Health Study

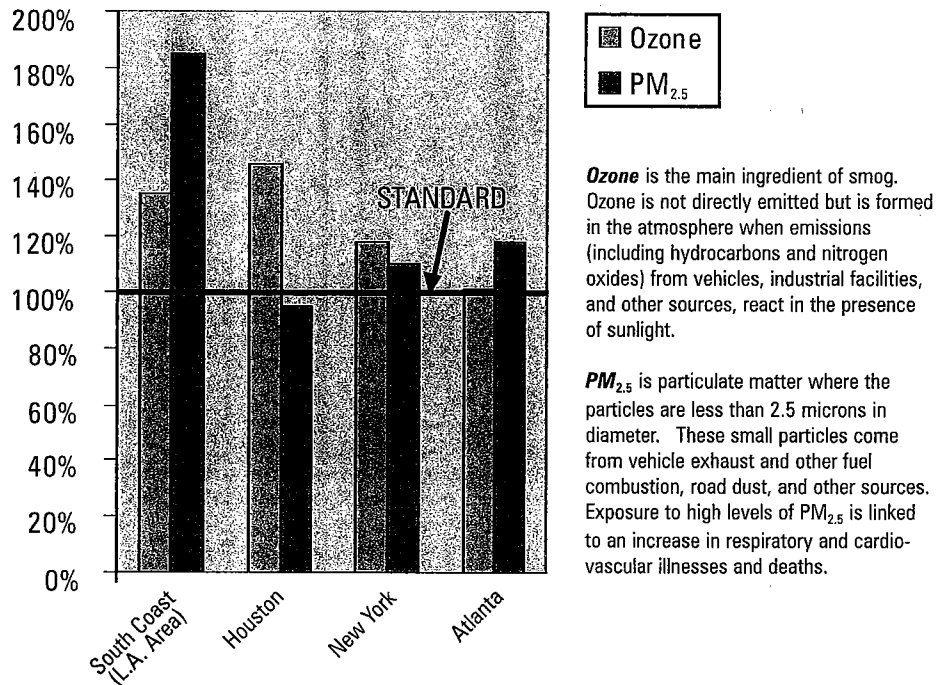
FIGURE 3:

MOBILE SOURCES ARE THE MAJOR CONTRIBUTORS TO OXIDES OF NITROGEN IN THE REGION'S AIR



Source: South Coast Air Quality Management District, Air Quality Management Plan, 2003.

FIGURE 4:

**MAXIMUM POLLUTANT CONCENTRATIONS AS PERCENT OF FEDERAL STANDARDS
SOUTH COAST AIR BASIN COMPARED TO OTHER URBAN AREAS (2002)**


Source: AQMD Air Quality Standards Compliance Report, 2003.

more-polluted communities develop more slowly and that these deficits probably have long-term health and social consequences.³ [Figs. 1 & 2] CHS results also show that children with asthma get sicker when exposed to higher levels of pollutants associated with traffic emissions [Fig. 3], such as particulate matter (PM) and nitrogen dioxide.

In addition, the CHS shows that (1) in higher ozone communities, children with significant outdoor activity develop asthma more often than children in less polluted communities, and (2) when ozone levels go up, children develop more acute respiratory problems, causing them to miss school. These absences, in turn, create an added economic burden for caregivers,⁴ and for school districts which lose per-pupil funding. They may also interfere with a child's education.

Federal government deadlines for cleaning the region's air have been delayed

The four-county region (L.A., Orange, Riverside and San Bernardino) has some of the highest levels of particulate matter (small particle pollution from exhaust, fuel combustion, road dust and other sources) and ozone in the

country. [Figs. 4, 5 & 6]. Ozone levels last year rose to the highest levels in the past five years. [Fig. 7]. Under a plan implemented by the South Coast Air Quality Management District (AQMD), the area had until 2010 to achieve improved air quality. But in April 2004, the U.S. Environmental Protection Agency (EPA) issued stricter ozone rules that, while they will be harder for Southern California to meet, also extended its smog cleanup deadline to 2021.

New mobile sources of pollution continue to be added

Already accommodating 16 million people, 9 million cars, and 261,000 diesel vehicles, by 2020 the four-county region of the LA metropolitan area will add several million more cars and thousands more trucks to the roads,

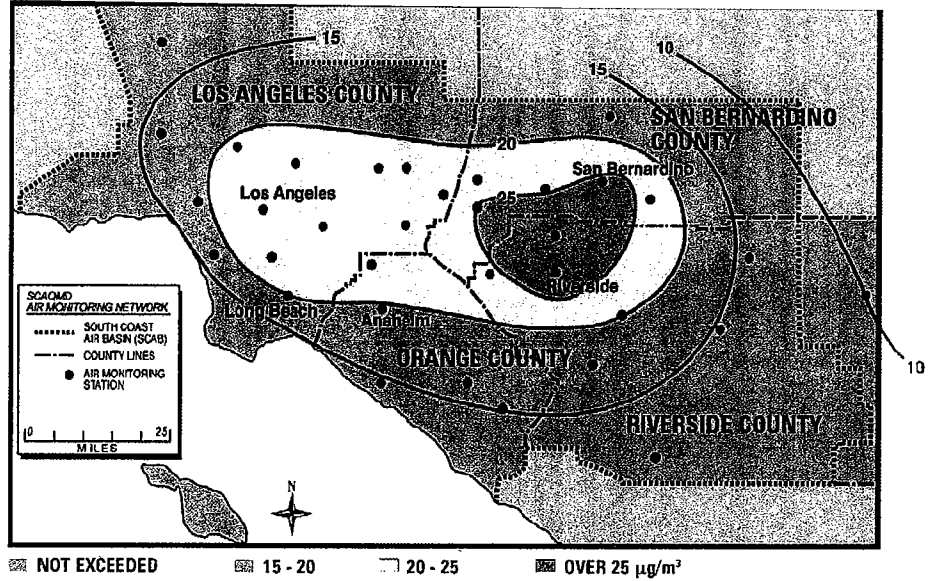
³ Kuenzli N, McConnell R, Bates D, Bastain T, Hricko A, Lurmann F, Avol E, Gilliland F, Peters J. Breathless in Los Angeles: the exhausting search for clean air. *Am J Public Health*. 2003 Sep;93(9):1494-9. Includes references for many of the papers reporting CHS results.

⁴ Jane V. Hall, Victor Brajer, and Frederick W. Lurmann. Economic valuation of ozone-related school absences in the South Coast Air Basin of California. *Contemporary Economic Policy*. Vol. 21, No. 4, October 2003, 407-417.

FIGURE 5:

ANNUAL AVERAGE PM_{2.5} CONCENTRATIONS, 2002 (ARITHMETIC MEAN, $\mu\text{g}/\text{m}^3$)

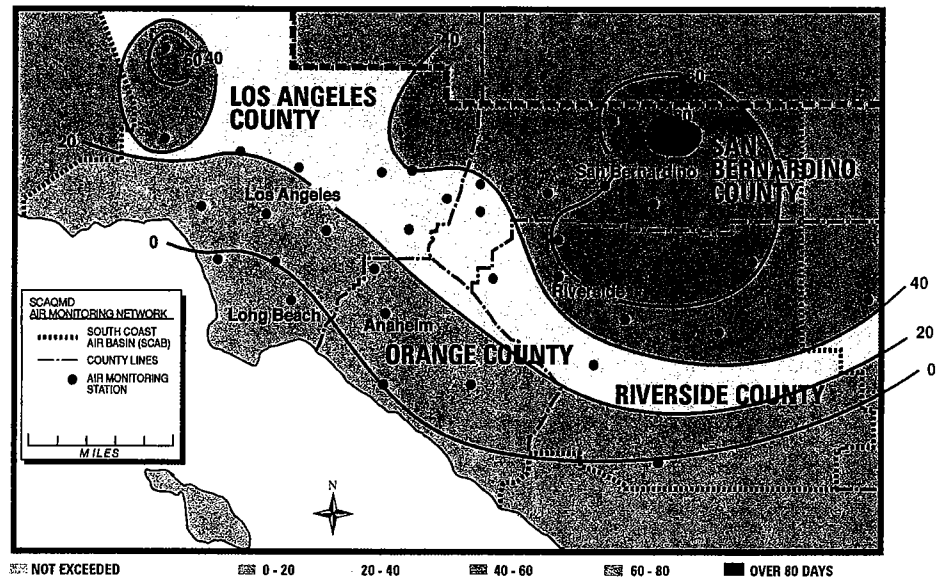
[Note: the current California Air Resources Board state standard is 12 $\mu\text{g}/\text{m}^3$ as an annual average]



Source: AQMD, Air Quality Standards Compliance Report, 2003.

FIGURE 6:

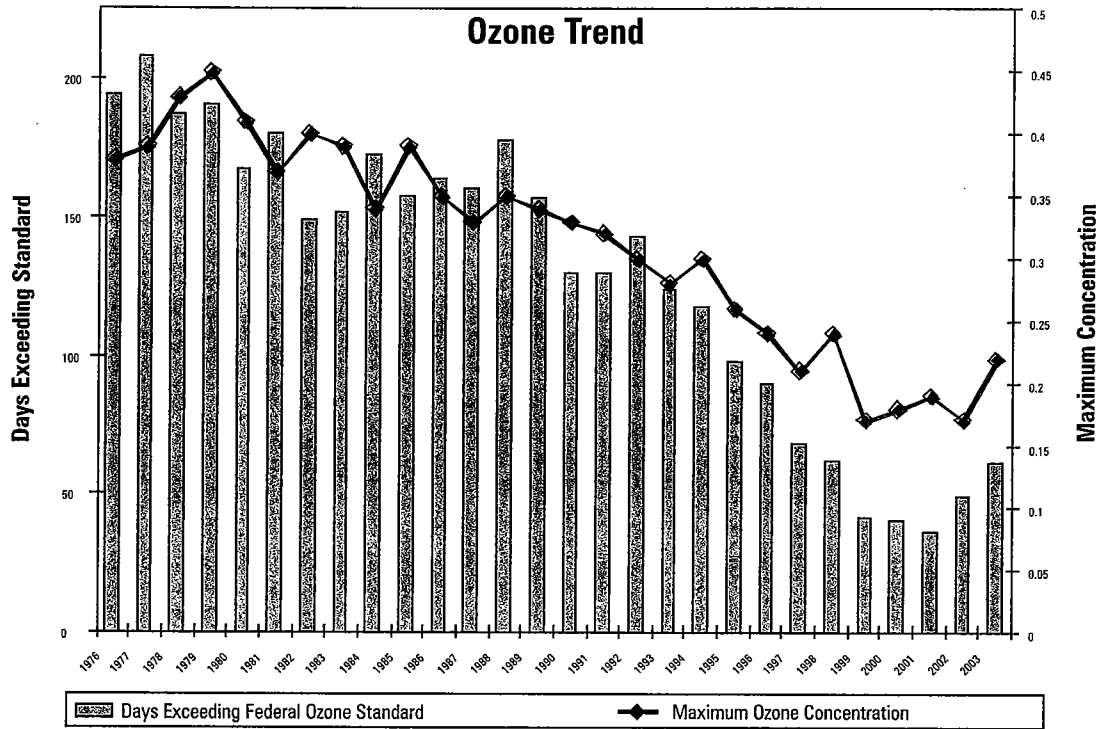
NUMBER OF DAYS EXCEEDING THE FEDERAL 8-HR OZONE AIR QUALITY STANDARD IN 2003



Source: AQMD, Air Quality Standards Compliance Report, 2004.

FIGURE 7:

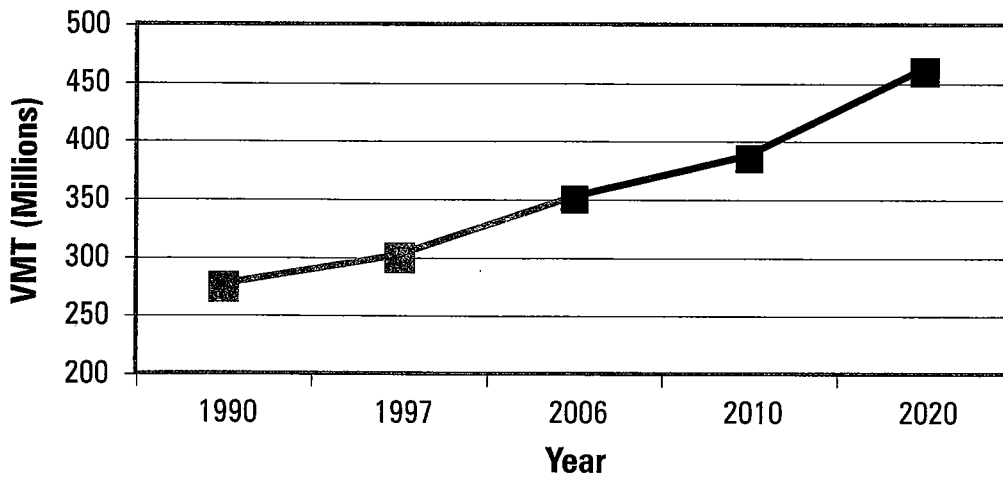
OZONE AIR QUALITY TRENDS IN THE SCAQMD (1976 - 2003)



Source: AQMD, Air Quality Standards Compliance Report, 2004.

FIGURE 8:

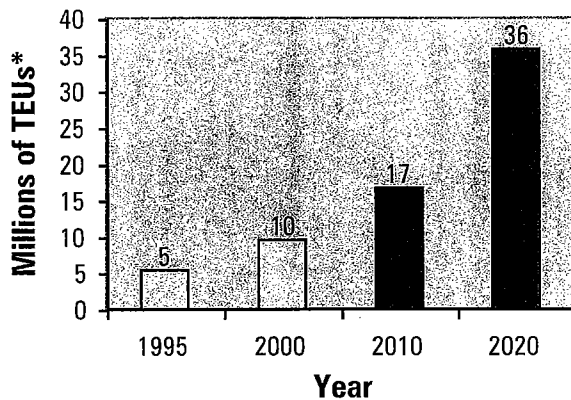
DAILY VEHICLE MILES TRAVELED (VMT) IN 4-COUNTY REGION



Source: AQMD, Air Quality Management Plan, 2003.

FIGURE 9:

CONTAINER TRAFFIC FORECAST FOR THE PORTS OF LOS ANGELES AND LONG BEACH



*TEU = a twenty-foot equivalent unit or a twenty-foot cargo container

Source: Data from Ports of Los Angeles and Long Beach, 2004.

increasing total vehicle miles traveled by 35%. [Fig. 8] In addition, the Los Angeles/Long Beach Port complex has become the world's third largest port, flooding the region with imported cargo containers [Fig. 9] transported by ships and freight trains operating on low-grade fuel along with big-rig trucks, which together emit tons of airborne pollutants. By 2025, twice as many diesel locomotives and big-rig diesel trucks will be needed to handle booming international trade, and the number of truck trips a day on the I-710 Freeway, alone, is expected to jump from 47,000 to 100,000.⁵

Local interests to clean the air are hampered by global and federal priorities

Nearly all ships entering the two ports are foreign-flagged with their emissions virtually unregulated. Currently, locomotives and airplanes are covered by federal rules that require much less stringent emission controls than cars and trucks, even though the AQMD calls the port complex and the L.A. International Airport the region's two largest single sources of air pollution. Still more pollution will be emitted as U.S. roads open to unregulated Mexican trucks, the result of a recent Supreme Court decision upholding President Bush's authority (under free trade agreements) to allow the trucks through without any review of environmental effects. Without strict controls on these major emission sources under international and federal jurisdiction, state and local air pollution regulators are forced to require more controls on other sources, including small businesses, to reduce air pollution.

Millions of children will be at increased risk if the air is not cleaned until 2021

Some four million children younger than 18 live in the four-county region, breathing today's polluted air. CHS researchers studied adolescents who left the Los Angeles area and found that lung function growth improved in those who moved to areas with lower particle pollution. These findings strongly suggest that children currently living in more-polluted communities would derive *immediate* health benefits if the air became cleaner.

Failure to control all significant air pollution sources in the region on a tight timeline will hurt future generations, since new cars, SUVs, trucks, locomotives, and ships purchased today will spend many decades polluting the region's air. Between now and the 2021 EPA deadline for clean air, more than five million babies will be born in these counties and will be subjected to increased risk of respiratory problems from air pollution.

Health effects may be preventable with cleanest available technology

The AQMD director recently stated that the Los Angeles basin's air can be cleaned of mobile-source diesel pollution only by "deploying the cleanest commercially-available technologies as soon as possible."⁶ For all vehicles, the region must (1) develop cleaner, low-emission engines or

⁵ Meyer, Mohaddes Associates, Inc. *Draft Port of Los Angeles Baseline Transportation Study*. December 2003.

⁶ Wallerstein, Barry. A local air district's view of diesel emissions. Presentation to the California Air Pollution Control Officer's Association Conference on Diesel. January 27, 2004.

FIGURE 10:

SOUTHERN CALIFORNIA REGIONAL TRAFFIC TRENDS AND AIR POLLUTION LEVELS: ROAD TO AN UNHEALTHY FUTURE?

2004 Children's Health Study Results: Today's Air in More-Polluted Communities	Projections (constraints for reducing pollution)	Air Pollution Levels	Key control strategies needed to reduce traffic emissions	Steps to Protect Health
<ul style="list-style-type: none"> ↓ Children's lung function growth ↑ Rate of school absences from acute respiratory problems after pollution levels are high ↑ Rate of asthma exacerbations ↑ Economic costs to care for children who are sick and miss school 	<ul style="list-style-type: none"> ↑ Population - 22% increase by 2020 ↑ Cars and trucks - 35% increase by 2020 in vehicle miles traveled <ul style="list-style-type: none"> ↑ Capacity of freeways ↑ International Trade - 300% increase in imported cargo containers by 2025 <ul style="list-style-type: none"> ↑ 200% increase in number of diesel locomotives ↑ 240% increase in number of big-rig trucks on I-710 and other freeways ↑ Number of port terminals ↑ Number of cargo warehouses ↑ Size of rail yards ↑ Number of trucks from Mexico ↑ Capacity of Airports 	<ul style="list-style-type: none"> ↑ Ozone levels on the rise during past 5 years; among highest in the U.S. ↑ Particle (PM₁₀) levels from on-road mobile sources will increase 4% by 2030, according to the Regional Transportation Plan of the Southern California Association of Governments (April 2004) ? Particle (PM_{2.5}) levels among highest in the U.S. No projections available. Federal regulations expected to require meeting a 2014 deadline. 	<ul style="list-style-type: none"> ↑ Use of alternative fuels ↑ Number of low or zero-emission vehicles ↑ Fuel economy ↑ Cleanup or retrofit of existing fleets ↑ Removal of the most polluting engines ↑ Public transit ↑ Car pools ↓ Travel demand (use vehicles less) 	<ul style="list-style-type: none"> ↑ Consideration of "health" in planning, land use, economic development, and transportation decisions ↑ Evaluation of health effects' economic costs ↑ Education of public officials about the impacts of air pollution on health ↓ Emissions from mobile sources under federal and international control

2004 → **New state and federal rules expected to be implemented between 2004 - 2021 to address mobile source emissions** → **2021**
DEADLINE TO CLEAN THE AIR

alternative fuels, (2) increase fuel economy, (3) clean up or retrofit existing fleets, and (4) remove the most-polluting engines from operation. Without success in these areas, other strategies to clean the air will not likely succeed.⁷ A recent Supreme Court ruling, however, prohibits the AQMD from requiring private trucking and vehicle fleet operators to purchase low-polluting vehicles, again limiting local regulators who recognize the seriousness of Southern California's air pollution problem.

Transportation and land use decision makers need to integrate concerns about air pollution's adverse health impacts and related health costs

Government agencies, planners and elected officials are striving to expand the four-county transportation infrastructure. They are pushing for expansion of freeways, rail facilities and bridges to move increasingly larger volumes of imported cargo from the ports to the rest of the country.⁸ Advocates for economic development argue that expanding international trade, the ports, and related infrastructure is critical to the region's economic growth.⁹ Yet, these discussions continue to omit significant public health considerations.

The challenge ahead is for regional planners, economists, elected officials and other decision-makers to develop an integrated approach to developing the region's infrastructure, with a high priority on protecting health.

This requires a proactive effort to develop a true dialogue with scientific researchers, air-pollution regulators, and impacted communities so that the health and well-being of the region's children does not fall victim to political and economic interests. Southern California might look to efforts of other regions that are incorporating guiding principles for sustainable transportation into their planning to reduce negative impacts on residents.¹⁰ Without a visionary public health regulatory policy to reduce air pollution from *all* significant mobile sources — including ships, planes, locomotives, and some trucks under currently relaxed international and federal regulations — we are on the road to an unhealthy future for millions of Southern California children. [Fig. 10]

⁷ Additional policy strategies, regulatory actions, and behavioral changes that could reduce air pollution, such as reducing travel demand, improving vehicle inspections, investing in public transit, and limiting urban sprawl can be found in Ref. #3.

⁸ See, for example, Southern California Association of Governments, Goods Movement Program White Paper, January 2002.

⁹ See, for example, Los Angeles Economic Development Corporation, International Trade Trends and Impacts: The Southern California Region, 2003 Results and 2004 Outlook, May 2004.

¹⁰ See, for example, OECD International Conference, Vancouver, Canada, 24-27 March, 1996. Guiding Principles for Sustainable Transportation. <http://www.gdrc.org/uem/sustran/sustran-principles.html>
Resource: Hricko A and Markuze K. "A Breath of Air: What Pollution is Doing to our Children," a 28-minute documentary video describing results of the CHS. Available in English and Spanish (free) from the California Air Resources Board: <http://www.arb.ca.gov/research/health/school/school.htm>

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