

September 15, 2007

Joshua Marx, Regulatory Project Manager  
US Army Corps of Engineers  
Kansas City District

Re: Permit No. 2006-1014

Applicant: BNSF Railway Company  
4515 Kansas Avenue  
Kansas City, KS 66106

Dear Mr. Marx,

I am a homeowner in close proximity to the proposed BNSF Railway facility. I have many concerns regarding the proposed facility and wish to state that I am adamantly against the proposed project. The City of Gardner and majority of its elected officials are in no way looking out for the best interests of the community, nor do they represent the opinions of the vast majority of citizens impacted. The most obvious solution to address the impacts addressed below would be to relocate the proposed facility a safe distance from populated areas. The following areas of concern are reasons why I believe this proposed facility should not be allowed:

***Drinking water:*** Hillsdale Lake supplies a large population including many communities in the KC metropolitan area. The BNSF facility will greatly impact Bull Creek and many of its tributaries. Bull Creek is the primary tributary into Hillsdale Lake. Pollutant threats to the lake that currently exist include nitrogen, phosphorus, sediment and pesticide impairment. The proposed facility will subject Hillsdale Lake, our drinking water source with a multitude of organic contaminants and metals. Within EPA are numerous RCRA remediation and superfund projects documenting BNSF sites listing many of these contaminants. We have been told by BNSF and city representatives that new technologies will prevent this from happening, nor are these “new technologies” guaranteed for this facility. Regardless of the new technologies in place this facility still poses a great risk to the water resources that will impact thousands of area citizens. Monitoring and enforcement of facility operations, and water quality efforts will also subject the community to higher costs.

***Stormwater Runoff:*** Runoff from the area covered by impervious surfaces will result in significant degradation and contamination of the primary tributary to Hillsdale Lake, Big Bull Creek. The stormwater runoff will carry solvents from maintenance operations, cleaning agents, fuels, additives and other contaminants. Proposed stormwater basins are not a cure all system that will control these contaminants from impacting surface waters off site. Additional sediment and nutrient loads will also be created, increasing the current Clean Water Act impairment issues which the Hillsdale Lake watershed is attempting to address. Rerouting of the unnamed tributary will also increase sediment and nutrient loading, increasing the likelihood that the water quality standards will not be met for lake phosphorus levels.

**Groundwater:** Residents adjacent to the facility utilize groundwater as their primary drinking water source through wells. Groundwater contamination from railyard sites have been documented in multiple RCRA remediation projects. Again, the most obvious solution to address these impacts would be to relocate the proposed facility a safe distance from populated areas.

**Air quality impacts:** Air quality impacts will be felt by the entire KC metropolitan area. Traffic Studies conducted by the DOT on the proposed BNSF Logistics Park provide adjusted growth forecasts, calling for significant infrastructure improvements including; the need for six lanes on I-35 north of Gardner Rd., US-56 will be operating above capacity, need for widening to 4 lanes, need for other significant improvements in the immediate area including a new I-35 interchange. These changes are based upon BNSF figures of 59,809 trips per day, including 4,003 truck trips per day. Independent traffic estimates should be requested in which to base estimates upon.

Two significant impacts upon air quality will be caused by the intermodal facility. These include the creation of ozone from increased traffic and railyard equipment, and secondly increased concentrations of diesel particulate matter. As cited in recent articles of the KC Star, the metropolitan area will not meet Clean Air Act air quality goals in 2008 as a result of high ozone levels documented by EPA Region 7 in 2007. Additional air quality restrictions will be placed upon KC as a result of the non-attainment status. New sources of ozone should not be considered in areas which will heavily impact the future attainment of the Clean Air Act goals. Once again, the most obvious solution to address these impacts would be to relocate the proposed facility a safe distance from populated areas.

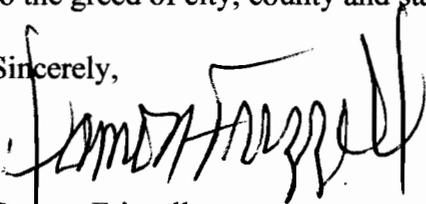
Each of these impacts will result in adverse health impacts upon the area citizens as documented in numerous medical journals and research papers due to the close proximity of the community (Attachments). Of particular concern are the new public schools directly north of the proposed facility, with the predominant wind direction being from the south.

**Safety and Security:** Many hazardous materials are transported in the containers transported through the proposed facility. Spills are common occurrences at rail yard sites. The types of hazardous materials transported by containers are also a concern of area citizens. Radioactive materials are shipped by containers; these types of materials must not be allowed in close proximity to a large populated area. Weapons of mass destruction are also a threat that should not be ignored. Terrorists are well aware of our shipping methods and could utilize this as a means to strike Middle America. For these reasons perimeter security is also a concern.

**Park Impacts:** The proposed facility is adjacent to a new county park in which Johnson county tax payers footed an enormous bill to benefit from new recreational opportunity. How many will now utilize this new park impacted by the aesthetics of a rail yard facility, noise of locomotives and rail yard equipment, and the runoff of pollutants into a re-routed stream that runs through the proposed facility and into the park. Not likely a good source of fish to take home and eat.

**Economic Impact:** Land and property values in the surrounding area have already been negatively affected. Only those owning land / property on and in the immediate area surrounding the facility have benefited from BNSF buyouts. The vast majority of area residents such as myself suffer the losses due to the greed of city, county and state officials waiting for increased tax revenues.

Sincerely,



Damon Frizzell  
35335 W. 167<sup>th</sup> St.  
Gardner, KS 66030

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- [1] [Diesel Particulate Matter Exposure of Underground Coal Miners09-19-2007](#)  
**Diesel** Particulate Matter Exposure of Underground Coal Miners , Federal Register document.  
<http://www.epa.gov/EPA-AIR/1998/April/Day-09/a9829.htm> (HTML)
- [2] [\[\[pp. 5675-5706\]\] Diesel Particulate Matter Exposure of Underground Coal Miners09-19-2007](#)  
 5675-5706]] **Diesel** Particulate Matter Exposure of Underground Coal Miners , Federal Register document.  
<http://www.epa.gov/EPA-IMPACT/2001/January/Day-19/i995d.htm> (HTML)
- [3] [National - Scale Air Toxics Assessment for 1996: Estimate Emissions, Concentrations and Risk: Technical Fact Sheet06-05-2002](#)  
 ... EPA is issuing the national - scale air toxic assessment of the **health** risk estimates for 33 toxic air pollutants nationwide.  
[http://www.epa.gov/ttn/oarpg/t3/fact\\_sheets/nsata\\_fs.pdf](http://www.epa.gov/ttn/oarpg/t3/fact_sheets/nsata_fs.pdf) (PDF)
- [4] [New Studies Compare Composition and Toxicity of Diesel Exhaust | Newsroom | US EPA08-02-2005](#)  
 EPA Newsroom - Press Releases, Speeches, and the EPA Events Calendar  
<http://yosemite.epa.gov/opa/admpress.nsf/a883dc3da7094f97852572a00065d...>  
 (HTML)
- [5] [Region 6 Comparative Risk Project12-22-1998](#)  
 "Comparative risk studies are designed as tools for the prioritization of environmental problems."  
<http://www.epa.gov/region6/6en/xp/eri.pdf> (PDF)
- [6] [Diesel engine exhaust \(CASRN N.A.\) | IRIS | US EPA08-27-2007](#)  
**Diesel** engine exhaust (CASRN N.A.) &nbsp;  List of IRIS Substances Search IRIS by Keyword Full IRIS Summaries/Toxicological Reviews ...

<http://www.epa.gov/IRIS/subst/0642.htm> (HTML)

- [7] [Diesel engine exhaust \(CASRN N.A.\) | IRIS | US EPA05-30-2007](#)  
**Diesel** engine exhaust (CASRN N.A.) &nbsp;List of IRIS Substances Search IRIS by Keyword Full IRIS Summaries/Toxicological Reviews ...  
<http://www.epa.gov/iris/subst/0642.htm> (HTML)

- [8] [Full report06-15-1999](#)  
**Diesel** Emissions and Lung Cancer: Epidemiology and Quantitative Risk Assessment A Special Report of the Institute's **Diesel** Epidemiology Expert Panel **Health** Effects Institute June 1999 **HEALTH EFFECTS INSTITUTE** The **Health** Effects Institute, established in 1980, is an independent and unbiased **source** of information on the **health** effects of motor vehicle emissions ...  
<http://es.epa.gov/ncer/science/pm/hei/DieselEpi-C.pdf> (PDF)

- [9] [Health Effects Support Document for Manganese03-07-2003](#)  
"This document assists in determining whether to establish a national primary drinking water regulation for manganese."  
[http://www.epa.gov/safewater/ccl/pdfs/reg\\_determine1/support\\_cc1\\_magne...](http://www.epa.gov/safewater/ccl/pdfs/reg_determine1/support_cc1_magne...) (PDF)

- [10] [Arsenic Rule Benefits Analysis: An SAB Review09-05-2001](#)  
"This is a review by the Arsenic Rule Benefits Review Panel (ARBRP) of the U.S. EPA Science Advisory Board."  
<http://www.epa.gov/sab/pdf/ec01008.pdf> (PDF)

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[1] [National Center for Environmental Assessment](#)

NCEA serves as the national resource center for the overall process of human **health** and ecological risk assessments.  
<http://cfpub.epa.gov/ncea> (HTML)

[2] [National Air Toxics Program: The Integrated Urban Strategy: Report to Congress08-01-2000](#)

This document outlines EPA's plans for addressing cumulative **health** risks in urban areas.

<http://www.epa.gov/ttn/atw/urban/natprpt.pdf> (PDF)

[3] [National - Scale Air Toxics Assessment: Frequently Asked Questions09-25-2007](#)

"This page provides frequently asked questions about the national - scale air toxics assessment."

<http://www.epa.gov/ttn/atw/nata/natsafaq.html> (HTML)

[4] [Diesel Particulate Matter Exposure of Underground Coal Miners09-19-2007](#)

**Diesel** Particulate Matter Exposure of Underground Coal Miners , Federal Register document.

<http://www.epa.gov/EPA-AIR/1998/April/Day-09/a9829.htm> (HTML)

[5] [Control of Hazardous Air Pollutants from Mobile Sources: Regulatory Impact Analysis - Chapter 1: Mobile Source Air Toxics Health Information \(EPA420-R-07-002\)02-09-2007](#)

Regulatory Impact Analysis Control of Hazardous Air Pollutants from Mobile **Sources**  
Chapter 1 Mobile **Source** Air Toxics **Health** Information Assessment and Standards

Division Office of Transportation and Air ...

<http://www.epa.gov/otaq/regs/toxics/420r07002chp1.pdf> (PDF)

[6] [Environmental Assessment of Proposed Effluent Limitations Guidelines and Standards for Synthetic - Based Drilling Fluids and other Non - Aqueous Drilling Fluids in the Oil and Gas Extraction Point Source Category](#)02-04-1999

"This page provides links to the individual chapters of this environmental assessment."  
<http://www.epa.gov/waterscience/guide/sbf/sbfea/proposed-eadoc.pdf> (PDF)

[7] [Diesel Particulate Matter | Air Toxics | New England | US EPA](#)09-03-2007

**Diesel** Particulate Matter What is **Diesel** Particulate Matter. **Diesel** particulate matter is part of a complex mixture that makes up **diesel** exhaust ...  
<http://www.epa.gov/region1/eco/airtox/diesel.html> (HTML)

[8] [Diesel Particulate Matter | Air Toxics | New England | US EPA](#)09-03-2007

**Diesel** Particulate Matter What is **Diesel** Particulate Matter. **Diesel** particulate matter is part of a complex mixture that makes up **diesel** exhaust ...  
<http://www.epa.gov/region1/eco/airtox/fs/diesel.html> (HTML)

[9] [[pp. 5675-5706]] [Diesel Particulate Matter Exposure of Underground Coal Miners](#)09-19-2007

5675-5706]] **Diesel** Particulate Matter Exposure of Underground Coal Miners , Federal Register document.  
<http://www.epa.gov/EPA-IMPACT/2001/January/Day-19/i995d.htm> (HTML)

[10] [Draft Integrated Urban Air Toxics Strategy to Comply with Section 112\(k\), 112\(c\)\(3\) and Section 202\(1\) of the Clean Air Act](#)09-02-1998

This notice provides a draft strategy for public comment to address **health** impacts from air toxics in urban areas.  
<http://www.epa.gov/ttn/oarpg/t3/reports/urbanfr.pdf> (PDF)

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# Near-Roadway Exposure and Health

Chad Bailey

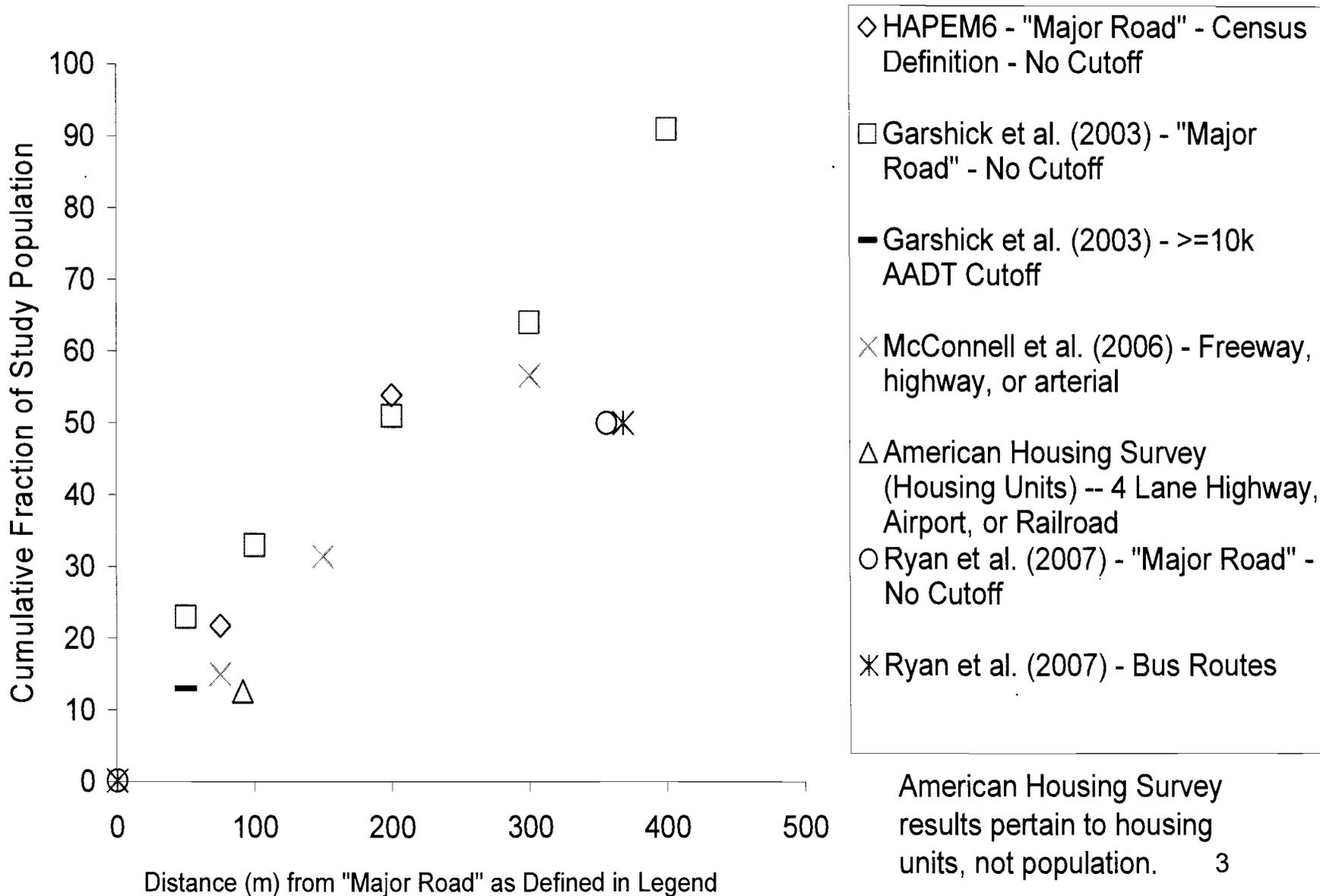
U. S. EPA

Office of Transportation and Air Quality  
Presentation for Air Toxics Workshop II  
Houston, Texas; June 12, 2007

# Key Points

- A significant fraction of the U.S. population lives very close to “major roads”
- Concentrations of PM<sub>2.5</sub>, ultrafines, PAH, and toxics are significantly higher near traffic
- In >>100 studies since late 1990s, living in proximity to heavy traffic is associated with significant increases in:
  - Cardiovascular effects
  - Prevalence of respiratory conditions and symptoms
  - Adverse birth outcomes (LBW, etc.)

Cumulative Population Fraction within X Meters of "Major Roads"  
 "Major Road" Definitions Shown in Legend



# Health Effects

Note: this is just a snapshot;  
please ask if you'd like a copy of  
the whole bibliography

# Near-Roadway Health Effects

- Residence or school near major roadways has been associated with:
  - Cardiovascular morbidity
  - Respiratory symptoms and conditions (e.g. asthma)

# Cardiovascular Effects

- Tonne et al. (2006) – Worcester, MA
  - Acute myocardial infarction associated with increased traffic near home and closer proximity to a major roadway
- Hoffman et al. (2006) – Germany
  - 85% increase in prevalence of coronary heart disease among residents living within roads with >30k AADT

# Children's Respiratory Health

- Cohort Studies
  - Southern California Children's Health Study
    - McConnell et al. (2005) reported that residence within 75 m of a major road was associated with increased risk of lifetime asthma, current asthma, and wheeze. Higher risks among those children with no family history.
    - Gauderman et al. (2006) reported that children growing up within 500 m of a freeway had deficits in lung growth between ages 10 and 18 years

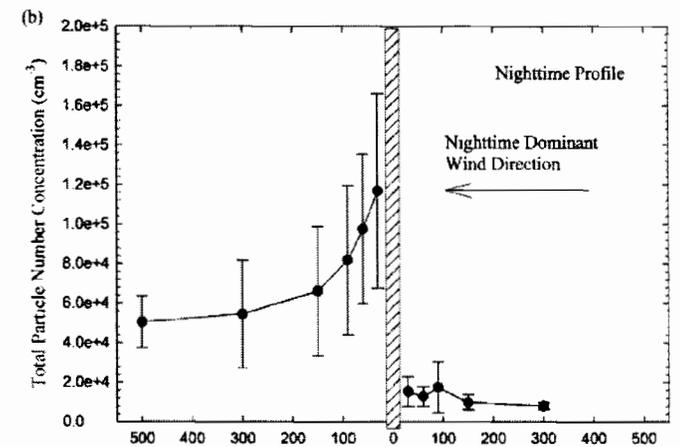
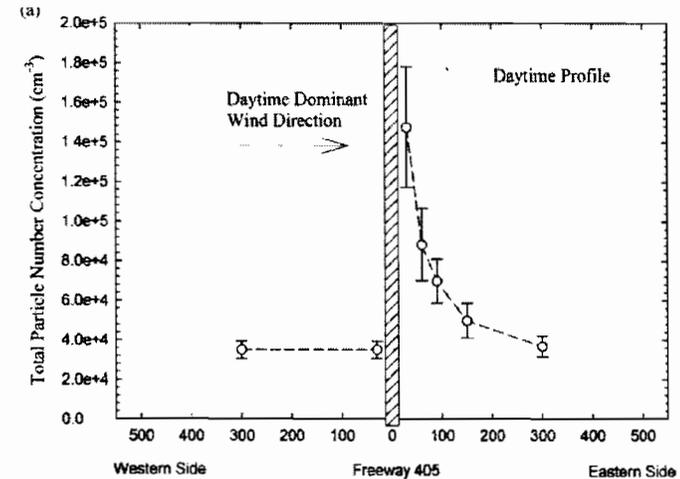
# Adverse Birth Outcomes – Specific Air Toxics (PAHs)

- Columbia Mothers and Newborns Study
  - Perera et al. (2003)
    - Measured PAH exposures in pregnant women in New York City associated with low birth weight and reduced head circumference
  - Miller et al. (2005)
    - Follow-up in birth cohort to Perera et al.
    - Maternal exposure to PAH during pregnancy associated with increase risk of wheeze and “probable asthma” by age 2 in homes with ETS
  - Bocskay et al. (2004)
    - Maternal exposure to PAH during pregnancy associated with elevated concentrations of “stable chromosomal aberrations” in umbilical cord blood lymphocytes
    - Predictive of long-term cancer mortality in other studies
  - Perera et al. (2006)
    - Prenatal PAH exposure associated with lower mental development scores at age 3

# Air Quality & Exposure

# Near-roadway PM distribution

- I-405 Freeway (Los Angeles)
  - Other studies in Cincinnati, OH, Raleigh, NC, New York, NY, Europe, Australia
- High numbers of particles near roadway indicate fresh emissions



Distance (m) from I-405 10

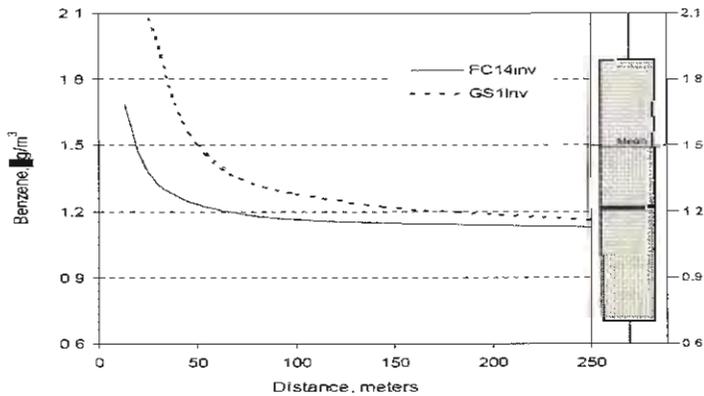
# EPA Funded the Development of a RIOPA GIS Database

- Weisel, C.P. Assessment of the Contribution to Personal Exposures of Air Toxics from Mobile Sources. Final Report to EPA Office of Transportation and Air Quality, 2004.
- Kwon, J. Development of a RIOPA Database and Evaluation of the Effect of Proximity on the Potential Residential Exposure to VOCs from Ambient Sources. PhD Dissertation, Rutgers University, New Brunswick, NJ, 2005.
- Kwon, J.; Weisel, C.P.; Turpin, B.J.; et al. (2006) Source proximity and outdoor-residential VOC concentrations: results from the RIOPA study. Environ Sci Technol 40: 4074-4082.
- Liu, W.; Zhang, J.; Kwon, J.; et al. (2007) Concentrations and source characteristics of airborne carbonyl compounds measured outside urban residences. J Air & Waste Manage Assoc 56: 1196-1204.

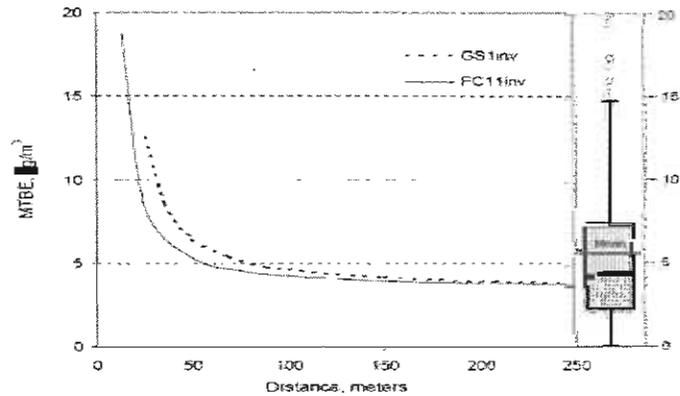
# Criteria and Hazardous Air Pollutant Trends – RIOPA

## (EPA Final Report – Elizabeth, NJ Results)

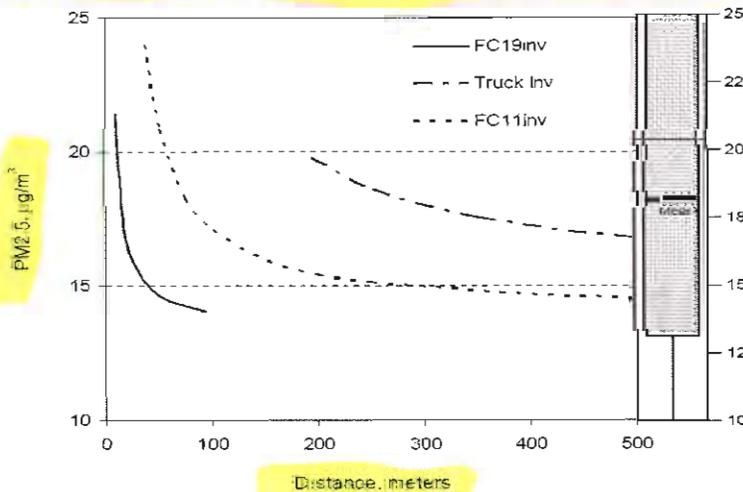
Benzene v. Urban Arterial, Gas Station



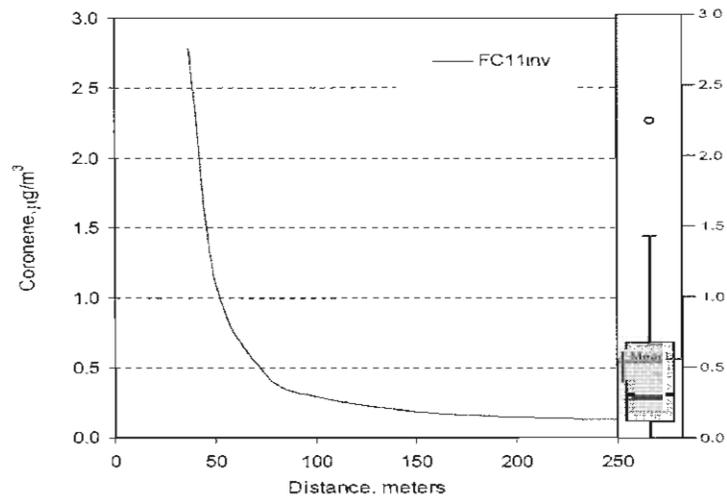
MTBE v. Urban Interstate, Gas Station



PM<sub>2.5</sub> v. Urban Interstate, Truck Loading, Local Rd.

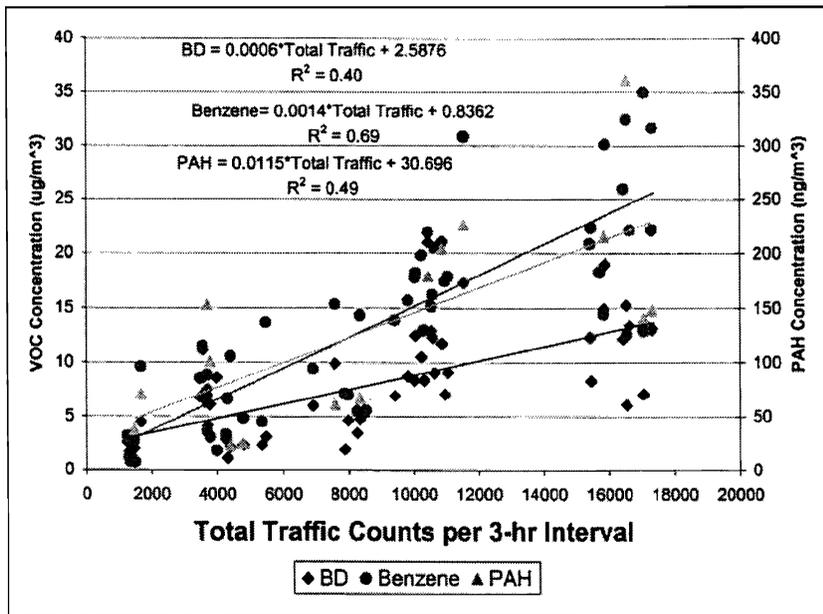


Coronene vs. Urban Interstate



# Air Toxics Near Roadways

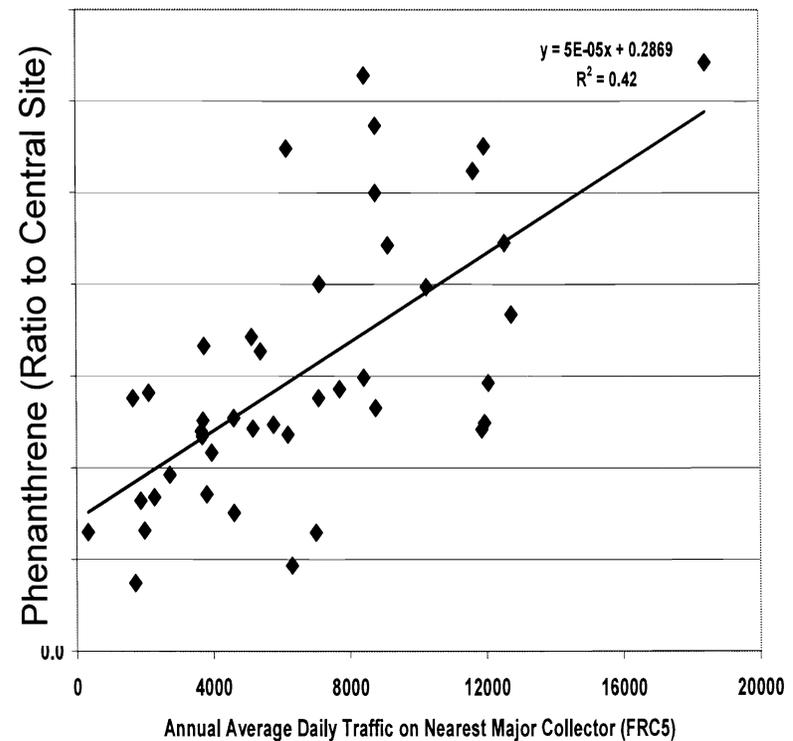
## Highway Tollbooth



*J. Air & Waste Manage. Assoc.* 53:740–748

Baltimore, MD

## Outside Residences and Schools



Fresno, CA

# Key Questions

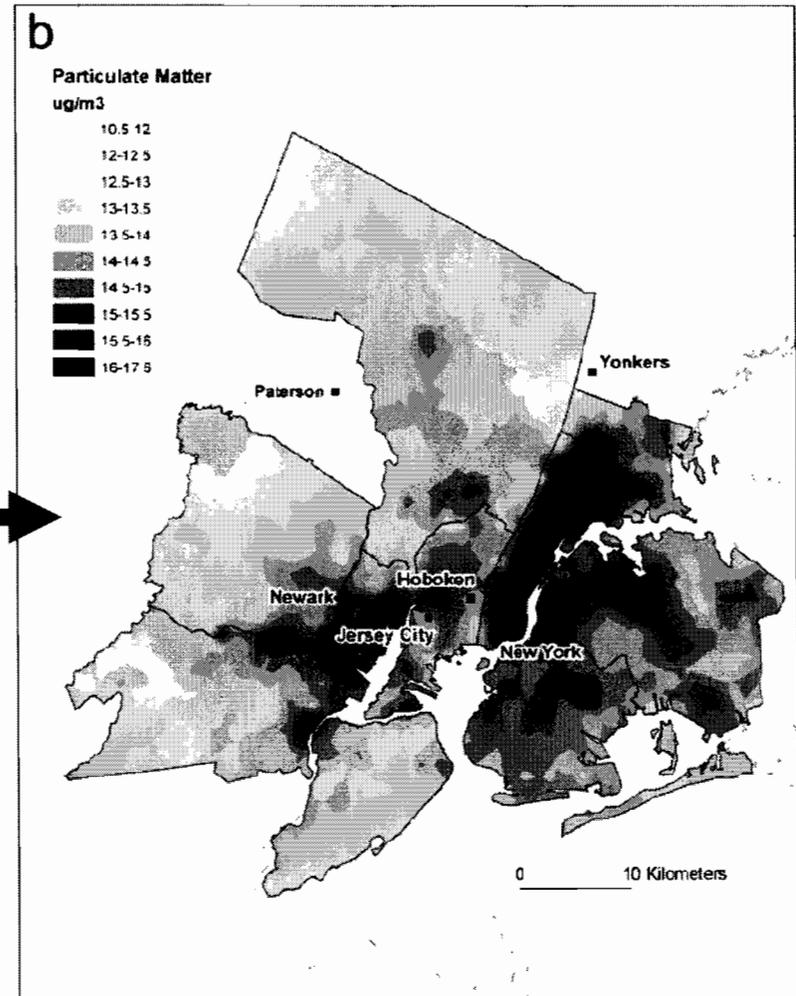
- How do all these microscale effects add up?
- Are they relevant for large segments of the general population

# NYC Land Use Regression

Ross et al. (2007) Atmos Environ 41: 2255–2269

Table 3  
Final model results

|                                       | Value  | SE    | <i>t</i> | <i>p</i> | VIF   |
|---------------------------------------|--------|-------|----------|----------|-------|
| <i>Model: 28 county (1999–2001)</i>   |        |       |          |          |       |
| Intercept                             | 12.273 | 0.261 | 46.965   | 0.000    |       |
| Traffic (500 m)                       | 0.121  | 0.027 | 4.530    | 0.000    | 1.344 |
| Population (1000 m)                   | 0.031  | 0.006 | 5.704    | 0.000    | 1.378 |
| Industrial land use (300 m)           | 0.028  | 0.010 | 2.721    | 0.009    | 1.253 |
| Multiple <i>R</i> -Squared            | 0.642  |       |          |          |       |
| Model <i>p</i> -value                 | 0.000  |       |          |          |       |
| <i>Model: 9-County (1999–2001)</i>    |        |       |          |          |       |
| Intercept                             | 13.171 | 0.364 | 36.232   | 0.000    |       |
| Traffic (500 m)                       | 0.098  | 0.025 | 3.967    | 0.000    | 1.196 |
| Population (1000 m)                   | 0.020  | 0.006 | 3.547    | 0.001    | 1.359 |
| Industrial land use (300 m)           | 0.040  | 0.013 | 3.005    | 0.005    | 1.321 |
| Multiple <i>R</i> -Squared            | 0.617  |       |          |          |       |
| Model <i>p</i> -value                 | 0.000  |       |          |          |       |
| <i>Model: 28-county (winter 2000)</i> |        |       |          |          |       |
| Intercept                             | 12.841 | 0.509 | 25.214   | 0.000    |       |
| Traffic (300 m)                       | 0.463  | 0.106 | 4.370    | 0.000    | 1.106 |
| Population (1000 m)                   | 0.033  | 0.010 | 3.355    | 0.002    | 1.181 |
| Vegetative land use (1000 m)          | -0.005 | 0.002 | -2.453   | 0.019    | 1.200 |
| Multiple <i>R</i> -Squared            | 0.607  |       |          |          |       |
| Model <i>p</i> -value                 | 0.000  |       |          |          |       |



# Stopping Point

- Millions of Americans live near major roadways
- Concentrations of criteria and hazardous air pollutants are elevated near roadways
- In urban areas, nearby traffic and other sources are major drivers of ambient concentrations of air pollution

# What Analytical Tools Are Available?

What tools are available to assess these concerns?

# Emissions

- Exhaust/Evaporative/Tire & Brake Wear
  - MOBILE6.2: emission factor model (g/mi)
  - HC, CO, NO<sub>x</sub>, toxics, PM<sub>10</sub>, PM<sub>2.5</sub>
  - Requires local information on fleet composition (MPO or on-site collection), fuel properties, I&M, road types, average speeds
  - Can be run for individual road links or for entire modeling domain
  - Key limitation: PM emission factors (ONLY) not sensitive to speed
- Nonroad engines
  - NONROAD model and documentation
  - *Emission Factors for Locomotives* (EPA420-F-97-051)

# Emissions

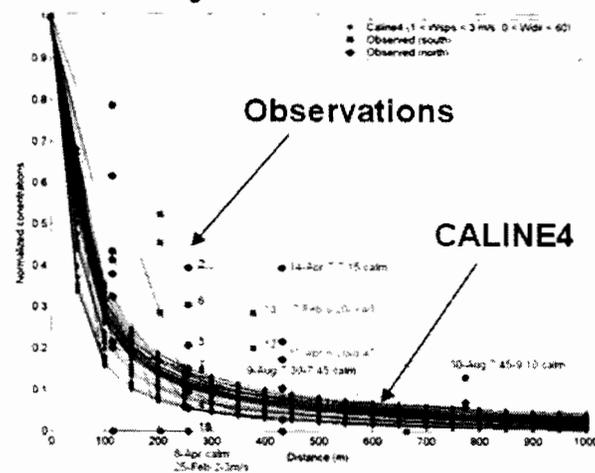
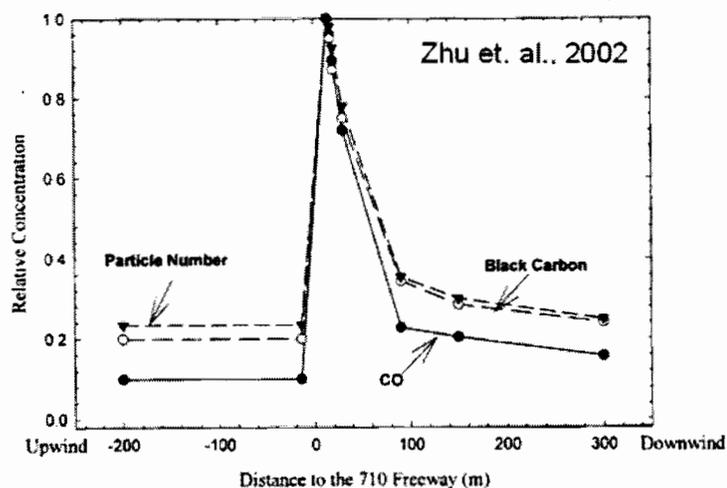
- Road dust
  - AP-42, Chapter 13
  - Alternate local methods if approved by EPA
- MOVES
  - EPA's next-generation emission factor model
  - Improved local detail, due to modal basis of emission prediction (e.g. idle, accel)

# Dispersion Models

- Roadway Sources
  - Line source dispersion models
    - CALINE3/4, CAL3QHC, UCD2001
  - Fast numerical models
    - QUIC
- Terminals, Rail Yards, other semi-stationary sources
  - AERMOD: EPA's multisource model

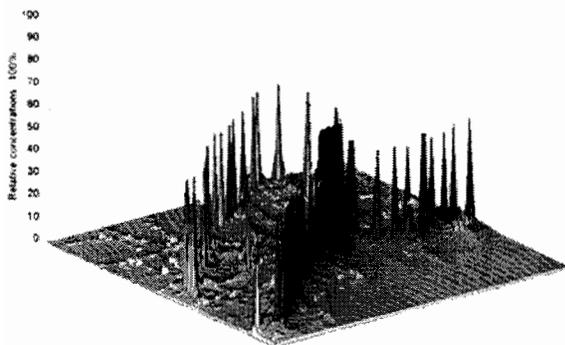
# Dispersion Model Outputs

## 1. Sharp gradient of pollutant gradients near roadways

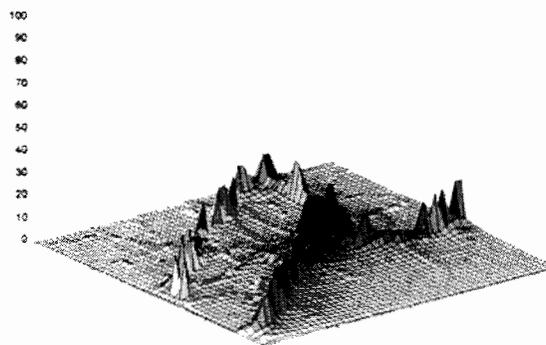


## 2. Fine-scale dispersion models required to resolve near-road pollutant gradients

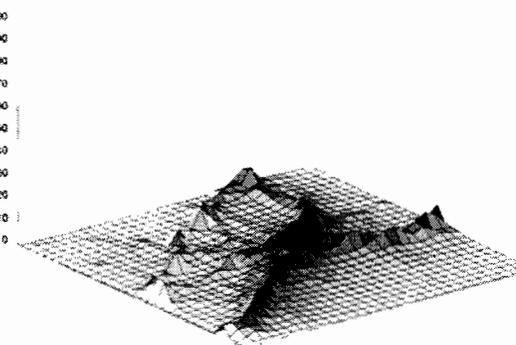
100m resolution



200m resolution



300m resolution



R. Baldauf, 2007

# How do EPA emission standards affect these concerns?

- EPA's recent mobile source rules will dramatically reduce the emissions of criteria and toxic pollutants over the next decade
- This is expected to reduce exposures to many pollutants
- However, other exposure agents (e.g. road and tire dust) may continue to grow over time
  - Near-roadway epidemiology studies do not use exposure indicators with source-specificity

# Conclusions

- A significant fraction of the U.S. population lives near major roadways
- Numerous air pollutant levels are elevated near major roadways and other transportation infrastructure
- Living (working/studying) near traffic is associated with a range of adverse health outcomes
- The extent to which emission standards solve the problems is still an open question



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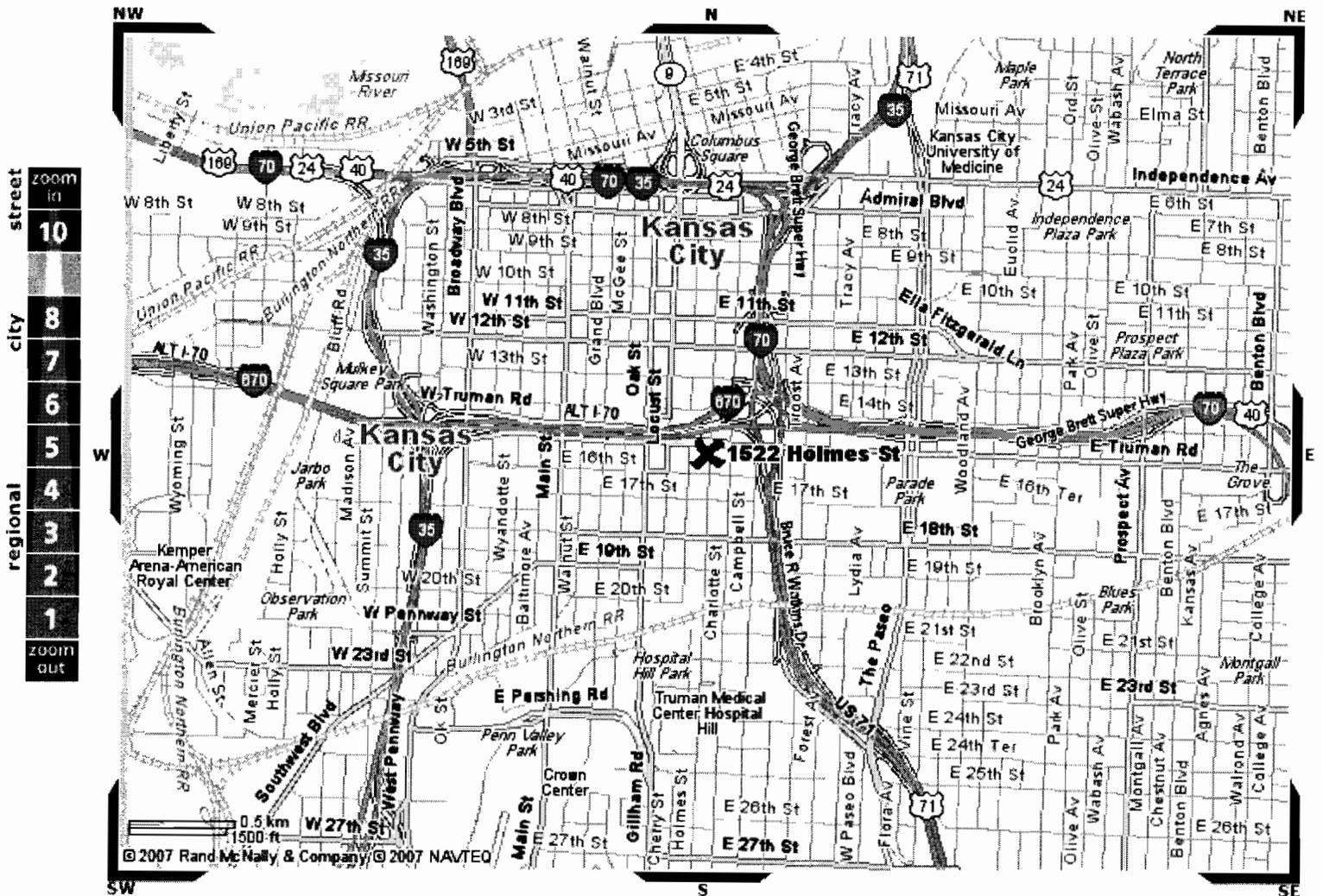
Solutions for You

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- Schools in Kansas City
- Kansas City Real Estate

MAP: 1522 Holmes St Kansas City, MO 64108-1536

• Get directions for this location

PRINT Express Map Save Email



Click on Map to:

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- Zoom In
- Zoom In & Recenter



Recenter map on address



**Find it in the Road Atlas****2008 Road Atlas**

- page 58, grid section I-3, KansasCity map
- page 58, grid section E-9

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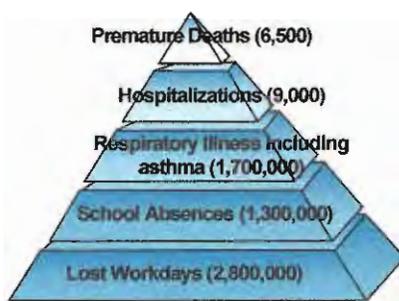
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## Recent Research Findings: Health Effects of Particulate Matter and Ozone Air Pollution, January 2004

Health Impacts of Air Pollution  
(per year)



Although air pollution levels in California have improved significantly in the past few decades due to aggressive controls on vehicles and industry, many Californians still breathe the worst air in the nation. California's climate and geography are conducive to the formation and accumulation of air pollution (especially in Los Angeles and the Central Valley). These factors, combined with increasing population and economic growth, the dramatically increasing number of vehicle miles traveled, and other factors, make it difficult to reduce pollution levels. Higher and longer summer temperatures have also worsened smog problems. The concentrations of several pollutants not only exceed California's health-based standards, but are often measured at levels up to two or three times the standards.

Premature deaths linked to particulate matter or "PM" are now at levels comparable to deaths from traffic accidents and second-hand smoke (CARB 2002a). One of the most dangerous pollutants, fine particulate matter (e.g., from diesel exhaust and fireplace soot) not only bypasses the body's defense mechanisms and becomes embedded in the deepest recesses of the lung, but also can disrupt cellular processes. Population-based studies in hundreds of cities in the U.S. and around the world have demonstrated a strong link between elevated particulate levels and premature deaths, hospital admissions, emergency room visits, and asthma attacks. Groundbreaking long-term studies of children's health conducted in California have demonstrated that particle pollution may significantly reduce lung function growth in children (Peters et al. 1999, Avol et al. 2001, Gauderman et al. 2002).

Another dangerous pollutant is ozone. Ozone is a powerful oxidant that can damage the respiratory tract, causing inflammation and irritation, and induces symptoms such as coughing, chest tightness, shortness of breath, and worsening of asthma symptoms. Ozone in sufficient doses increases the permeability of lung cells, rendering them more susceptible to toxins and microorganisms. The greatest risk is to those who are more active outdoors during smoggy periods, such as children, athletes, and outdoor workers. Exposure to levels of ozone above the current ambient air quality standard leads to lung inflammation and lung tissue damage, and a reduction in the amount of air inhaled into the lungs. Recent evidence has, for the first time, linked the onset of asthma to exposure to elevated ozone levels in exercising children (McConnell 2002). These levels of ozone also reduce crop and timber yields, damage native plants, and damage materials such as rubber, paints, fabric, and plastics.

Scientific research is constantly uncovering new information on air pollution health effects and the mechanisms by which pollutants damage the heart and lungs and contribute to asthma attacks and premature death.

#### **Air Pollution Causes Premature Death**

Attaining the California PM standards would annually prevent about 6,500 premature deaths, or 3% of all deaths. These premature deaths shorten lives by an average of 14 years. This is roughly equivalent to the same number of deaths (4,200 - 7,400) linked to second-hand smoke in the year 2000. In comparison, motor vehicle crashes caused 3,200 deaths and homicides were responsible for 2,000 deaths (CARB 2002a, and CDHS 2000).

#### **Air Pollution Leads to Hospitalizations and Emergency Room Visits**

Attaining the California PM and ozone standards would annually prevent approximately (CARB 2003a):

- 4,000 hospital admissions for respiratory disease.
- 3,000 hospital admissions for cardiovascular disease.
- 2,000 asthma-related emergency room visits.



#### **Air Pollution Contributes to Respiratory Illnesses and Cancer**

Attaining the California PM and ozone standards would annually prevent about (CARB 2003a):

- 400,000 cases of lower respiratory symptoms (such as a cough) in children ages 7-14.

- 400,000 cases of upper respiratory symptoms (such as, runny nose, wet cough, and burning, itching, red eyes) in children ages 9-11.
- 8,000 cases of chronic bronchitis.
- 500,000 cases of respiratory illnesses (including colds and flus) in adults ages 18-65.
- 350,000 asthma attacks (all ages).

Although statistics are not available for cases of lung cancer caused by all air pollutants, it is estimated that exposure to diesel PM causes about 250 excess cancer cases per year in California (CARB 2000). A recent study provides evidence that exposure to particulate air pollution is associated with lung cancer (Pope et al. 2002). This study found that residents who live in an area that is severely impacted by particulate air pollution are at risk of lung cancer at a rate comparable to non-smokers exposed to second-hand smoke. Definitive lung cancer mortality numbers as a result of air pollution cannot yet be determined, but this study found an approximately 16 percent excess risk of dying from lung cancer due to fine particulate air pollution.

#### **Air Pollution Contributes to Cardiac Illnesses**

The hearts of sensitive individuals (for example, the elderly) may be affected when they breathe in fine particulate matter. One study shows that individuals with existing cardiac disease can be in a potentially life-threatening situation when exposed to high-levels of ultrafine air pollution (Peters et al. 2001). Fine particles can penetrate the lungs and may cause the heart to beat irregularly or can cause inflammation, which could lead to a heart attack. Understanding this link is extremely important in quantifying the detrimental health effects of air pollution.

#### **Air Pollution Contributes to School Absences**

On a statewide basis, 1.3 million school absence days would be avoided annually if the current levels of ozone were reduced to attain the established 1-hour state standard (CARB 2004).

#### **Air Pollution is Costly**

Air pollution can and does have a serious impact on the State's economy. Figures related to asthma costs and the valuation of air pollution exposure are significant and staggering. Analyses indicate that the benefits of California's air quality program exceeds the costs by a ratio of about 3 to 1 (CARB 2003c).



In 1998, it was estimated that asthma costs in California totaled \$1.3 billion with hospitalizations and medications representing the largest direct expenditure (Asthma and Allergy Foundation of America 1998). Adult asthma patients spent an average of \$5,000 annually on medical expenses, lost wages, transportation, asthma-control products, and other asthma related expenses (Cisteinas et al. 2003).

Furthermore, an annual value of over \$3.5 billion is associated with hospitalizations and the treatment of major and minor illnesses, and about 2.8 million lost workdays each year, are all related to air pollution exposure in California. In addition, the value of premature deaths resulting from exposure to air pollution in excess of the State's PM2.5 standard is \$43 billion (CARB 2003a, CARB 2003b, CARB 2002a, U.S. EPA. 1999).

**Sensitive Groups Advised to Restrict Activities**

Sensitive groups, including the elderly, people with heart or lung disease, children and infants, can be at increased risk of experiencing harmful effects from exposure to air pollution. Sensitive individuals are advised to restrict certain activities when pollution levels are elevated. Recently, the number of unhealthy days in some areas of California (based on California standards that are more health-protective than federal standards. (CARB 2003b) has been approximately one out of every three days for ozone (CARB 2002b).

| <b>Unhealthy Days in 2002</b>             |                              |                           |
|---|------------------------------|---------------------------|
|   | <b>South Coast Air Basin</b> | <b>San Joaquin Valley</b> |
| Days Above National 8-Hour Ozone Standard | 96                           | 125                       |
| Days Above State 1-Hour Ozone Standard    | 116                          | 127                       |

People in almost every area in California are exposed to PM levels over the current standards.

| <b>State's Population Living in Areas that Exceed PM2.5 Air Quality Standards*</b> |     |
|--|-----|
| Annual National PM2.5 Standard   | 61% |
| Annual State PM2.5 Standard  | 89% |

\*Based on the proposed designations for PM2.5.

## Summary of the Health Effects of Air Pollution

| <b>Particulate Matter Health Effects</b>   | <b>Ground-level Ozone Health Effects</b>   |
|--|--|
| <ul style="list-style-type: none"><li>➤ Aggravated asthma</li><li>➤ Increased respiratory symptoms</li><li>➤ Chronic bronchitis</li><li>➤ Increased respiratory and cardiovascular hospitalizations</li><li>➤ Decreased lung function in children</li><li>➤ Lung cancer</li><li>➤ Premature deaths</li></ul> | <ul style="list-style-type: none"><li>➤ Aggravated asthma and possibly new cases of asthma</li><li>➤ Reduced lung capacity</li><li>➤ Increased susceptibility to respiratory illnesses</li><li>➤ Increased respiratory and cardiovascular hospitalizations</li></ul> |

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