



Public Health and Our Ports: The Road to Clean Air



RUTGERS
Center for Environmental
Exposures and Disease

Defining the Problem

Define the problem in term of:

- ▶ People's quality of life
 - ▶ Effects on health and well-being
 - ▶ Disparate impact on vulnerable and underserved populations
- ▶ Impact beyond the community - adjacent communities, roadways, the region



Our Panel

▶ **Walter Leak**

Deacon of Mt. Calvary United Church of the Deliverance, Elizabeth NJ

▶ **Howard Kipen, MD, MPH**

Professor, Rutgers School of Public Health/EOHSI, New Brunswick NJ

▶ **Panos Georgopoulos, PhD**

Professor, Rutgers School of Public Health/EOHSI, New Brunswick NJ

▶ **Melissa Miles**

Environmental Justice Manager, Ironbound Community Corporation, Newark NJ



Walter Leak

Deacon, Mt. Calvary United Church of the
Deliverance, Elizabeth NJ



Howard Kipen, MD, MPH

Professor, Rutgers School of Public Health
Environmental Occupational Health Sciences Institute
New Brunswick, NJ



Traffic Pollution and Your Health

Studies from NJ and The World

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Exposure to Traffic and the Onset of Myocardial Infarction

Annette Peters, Ph.D., Stephanie von Klot, M.P.H., Margit Heier, M.D.,
Ines Trentinaglia, B.S., Allmut Hörmann, M.S., H. Erich Wichmann, M.D., Ph.D., and Hannelore Löwel, M.D.,
for the Cooperative Health Research in the Region of Augsburg Study Group

ABSTRACT

BACKGROUND

An association between exposure to vehicular traffic in urban areas and the exacerbation of cardiovascular disease has been suggested in previous studies. This study was designed to assess whether exposure to traffic can trigger myocardial infarction.

METHODS

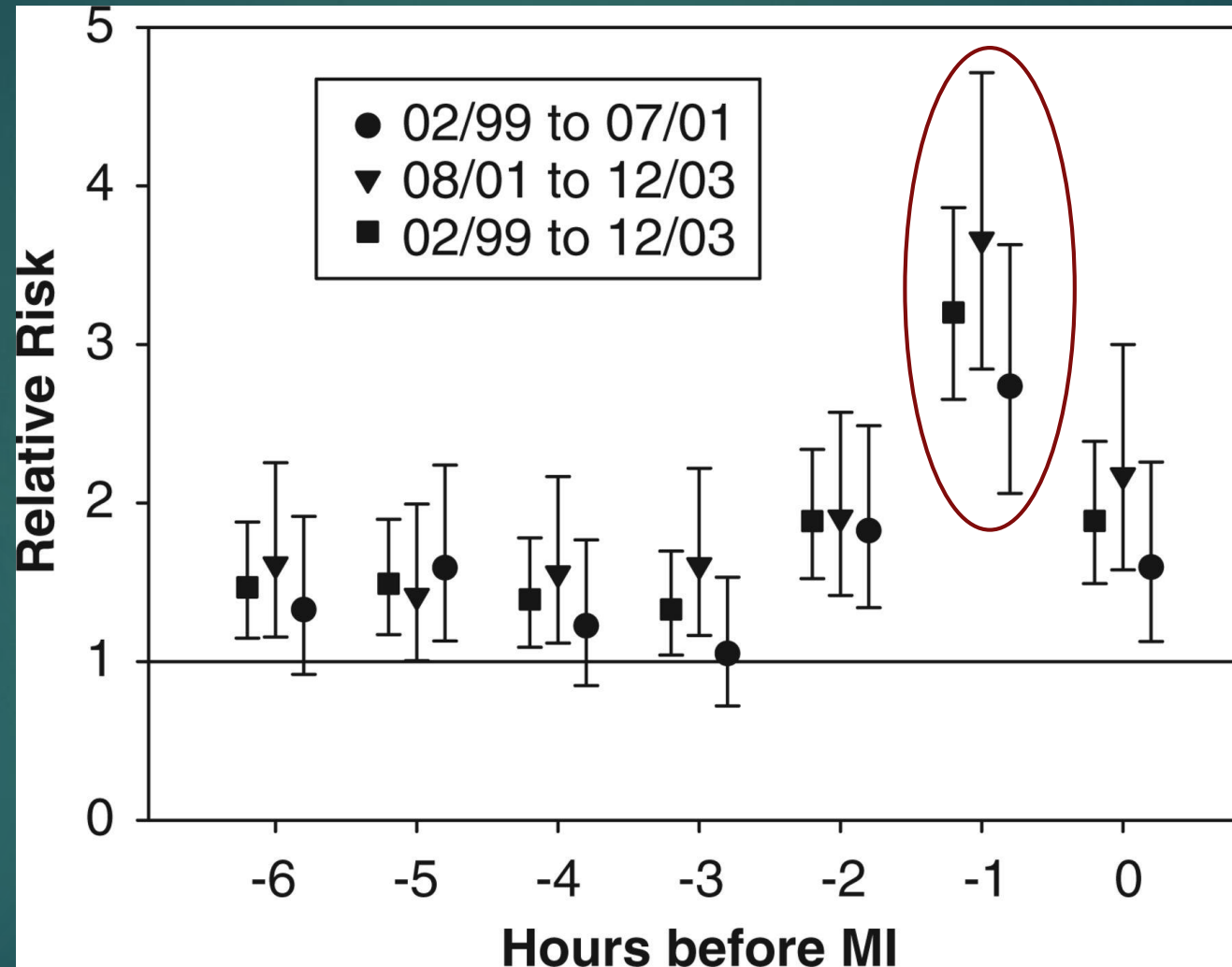
We conducted a case–crossover study in which cases of myocardial infarction were identified with the use of data from the Cooperative Health Research in the Region of Augsburg Myocardial Infarction Registry in Augsburg, in southern Germany, for the period from February 1999 to July 2001. There were 691 subjects for whom the date and time of the myocardial infarction were known who had survived for at least 24 hours after the event, completed the registry’s standardized interview, and provided information on factors that may have triggered the myocardial infarction. Data on subjects’ activities during the four days preceding the onset of symptoms were collected

From the Institute of Epidemiology (A.P., S.K., M.H., I.T., H.E.W., H.L.) and the Institute for Health Economics (A.H.), GSF–National Research Center for Environment and Health, Neuherberg; and the Department of Epidemiology, Medical Faculty, Ludwig-Maximilians-Universität, Munich (H.E.W.) — all in Germany. Address reprint requests to Dr. Peters at the Institute of Epidemiology, GSF–National Research Center for Environment and Health, Ingolstädter Landstr. 1, 87564 Neuherberg, Germany, or at peters@gsf.de.

N Engl J Med 2004;351:1721-30.

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Figure 2. Relative risk for experiencing an acute myocardial infarction after times spent in traffic adjusted for time of day, strenuous exertion, being outdoors and standing up after sleeping concurrently.



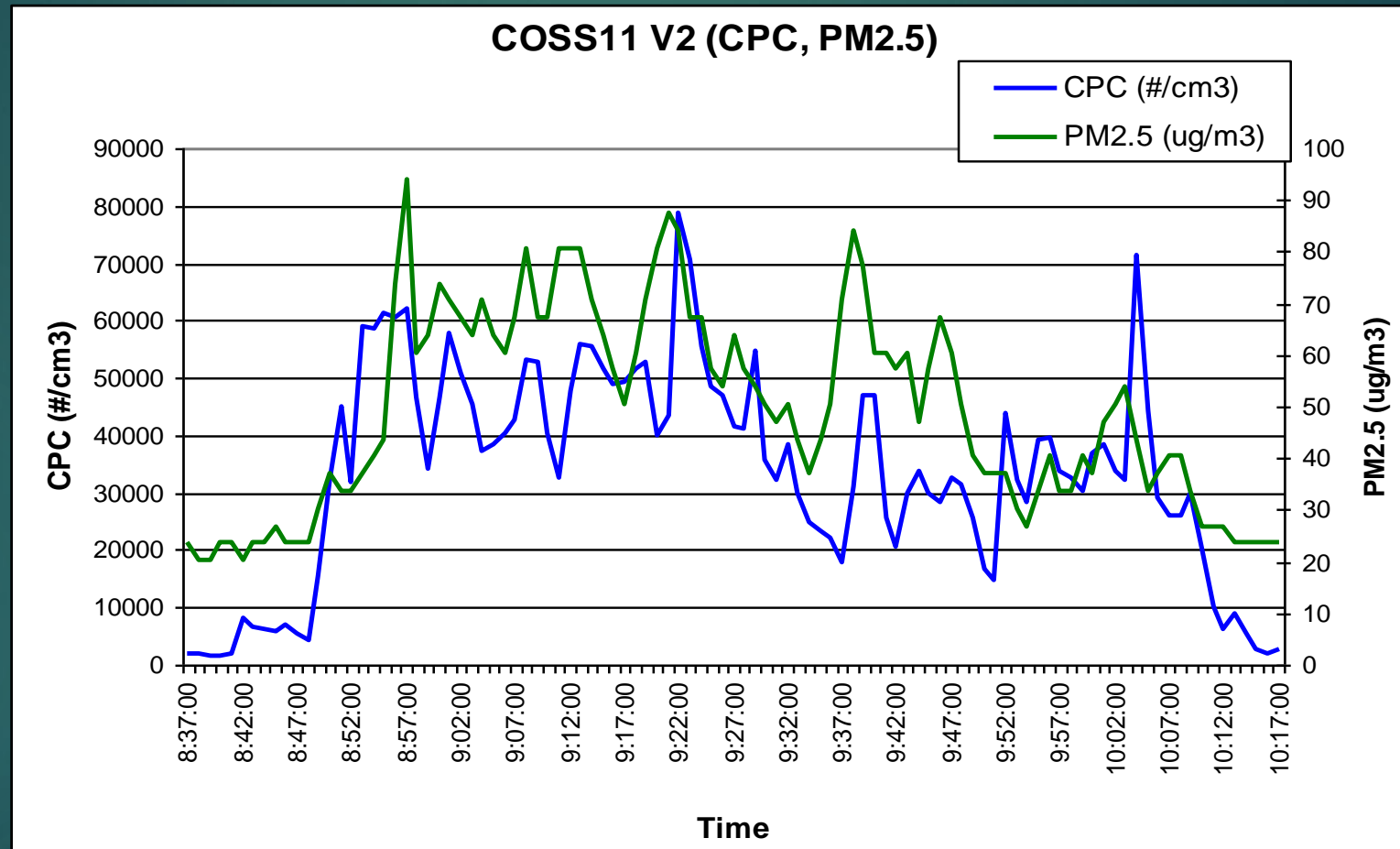
Peters A et al. European Journal of Preventive Cardiology
2012;20:750-758
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Traffic



http://blog.nj.com/ledgerupdates_impact/2007/11/large_traffic.jpg

Exposure: Traffic-related air pollution (TRAP)



Inside mask mean PN=43,921 +/- 3602

Mean PM_{2.5} = 21.8 +/- 2.4

Changes in Inflammation after a Turnpike Ride

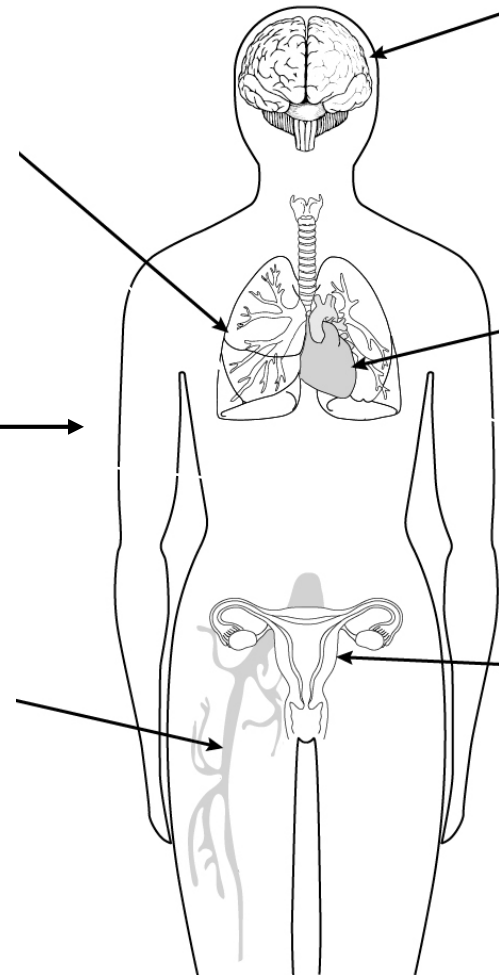
- ▶ 30% increase in a measure of lung inflammation
- ▶ Blood vessels of healthy controls behave like blood vessels from diabetics
- ▶ These human studies are consistent with the findings of the traffic and MI epidemiology studies.
- ▶ These biological results contribute to evidence that (diesel and other) traffic pollution rapidly increases risk for heart attacks
- ▶ Long term effects blood vessels are also seen
- ▶ Other studies have shown that these effects may be reversible with lowering of pollution

EMERGING TARGETS FOR AIR POLLUTION

- **Respiratory Disease Mortality**
- **Respiratory Disease Morbidity**
- **Lung Cancer**
- **Pneumonia**
- Rhinitis
- Airway inflammation
- Decreased lung function
- Decreased lung growth

- Insulin resistance
- **Type 2 diabetes**
- **Type 1 diabetes**
- Bone metabolism

- Changes in blood pressure
- Endothelial dysfunction
- Increased blood coagulation
- Systemic inflammation
- **Deep venous Thrombosis**



- **Stroke**
- Neurological development
- Mental health (anxiety / depression)
- **Neurodegenerative diseases**

- **Cardiovascular disease mortality**
- **Cardiovascular disease morbidity (heart attack)**
- Changes in heart rate variability
- ST-Segment depression

- Skin Aging

- **Premature birth**
- **Decreased birth weight**
- Decreased foetal growth
- In uterine growth retardation
- Decreased sperm quality
- Preclampsia

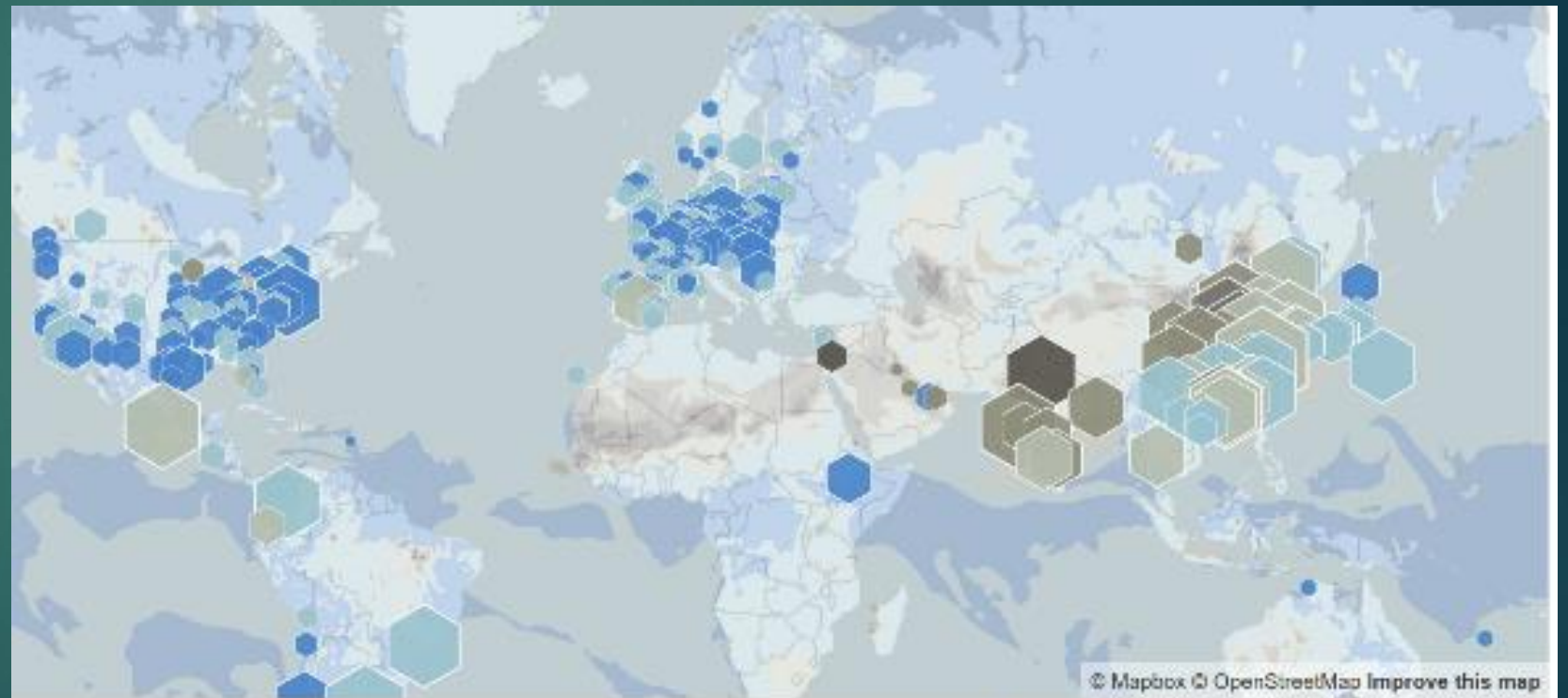


Panos Georgopoulos, PhD

Professor, Rutgers School of Public Health
Environmental Occupational Health Sciences Institute
New Brunswick, NJ

Comments on: Air Pollution and Our Cities with focus on Newark/Elizabeth and surrounding areas

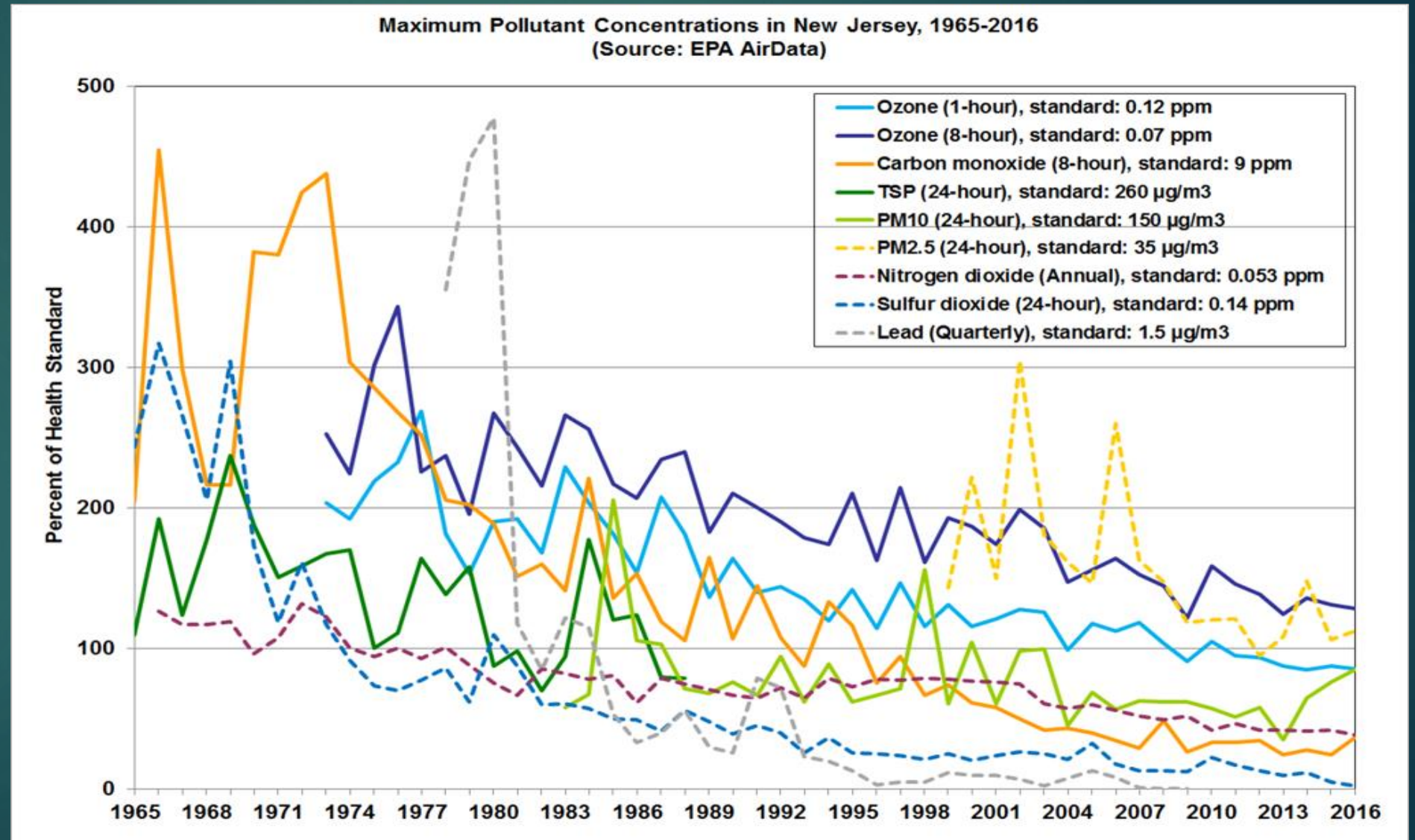
Public Health and Our Ports
October 26, 2108
Newark, NJ



World Air Pollution Map by Plume Labs
2018-10-25, 11 AM EST



First, the good news: air pollution in New Jersey has been steadily improving over the years

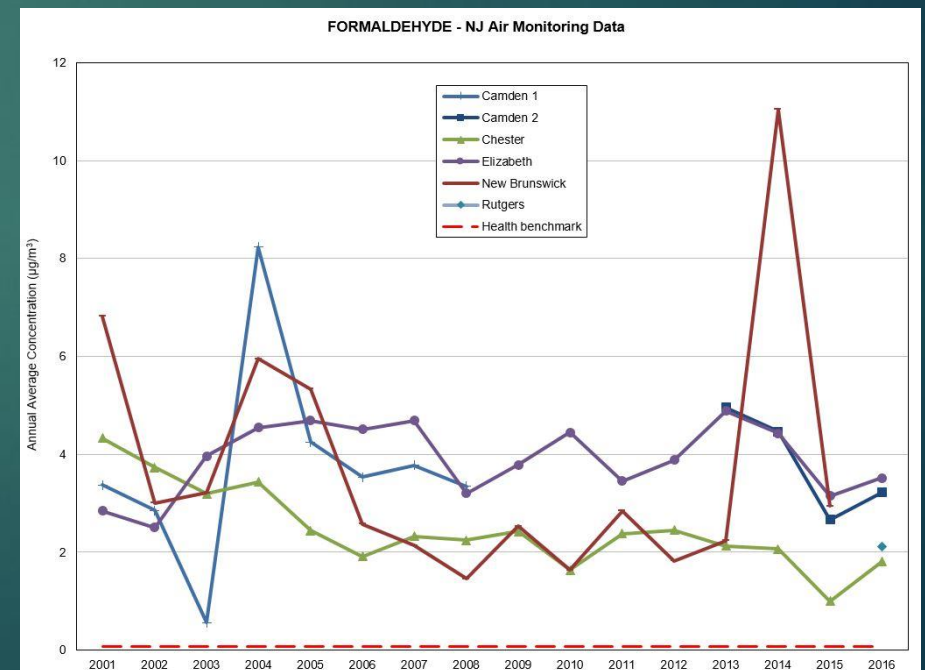
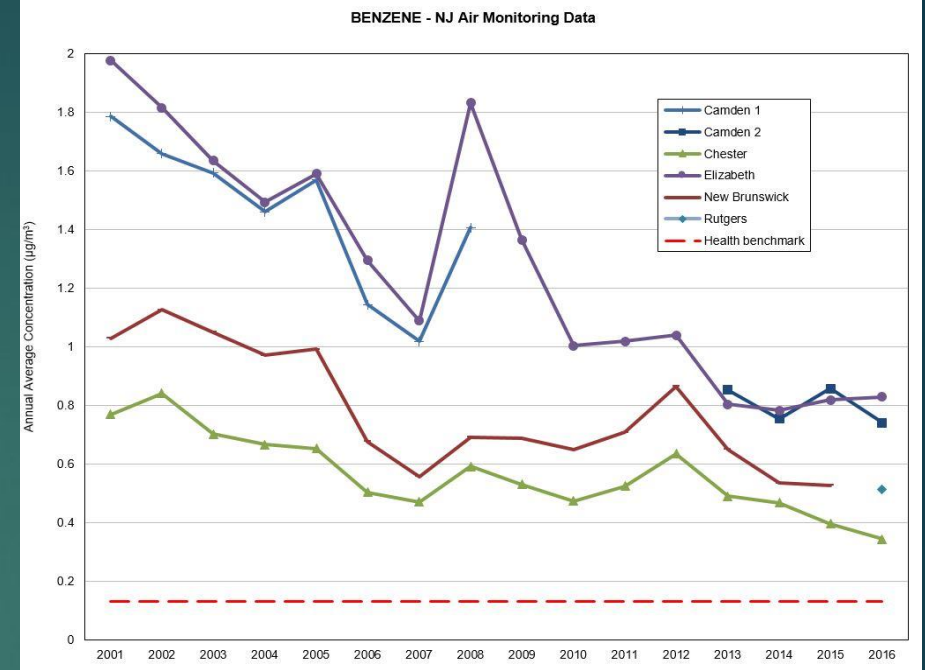


Trends of Criteria
Pollutant levels in
New Jersey

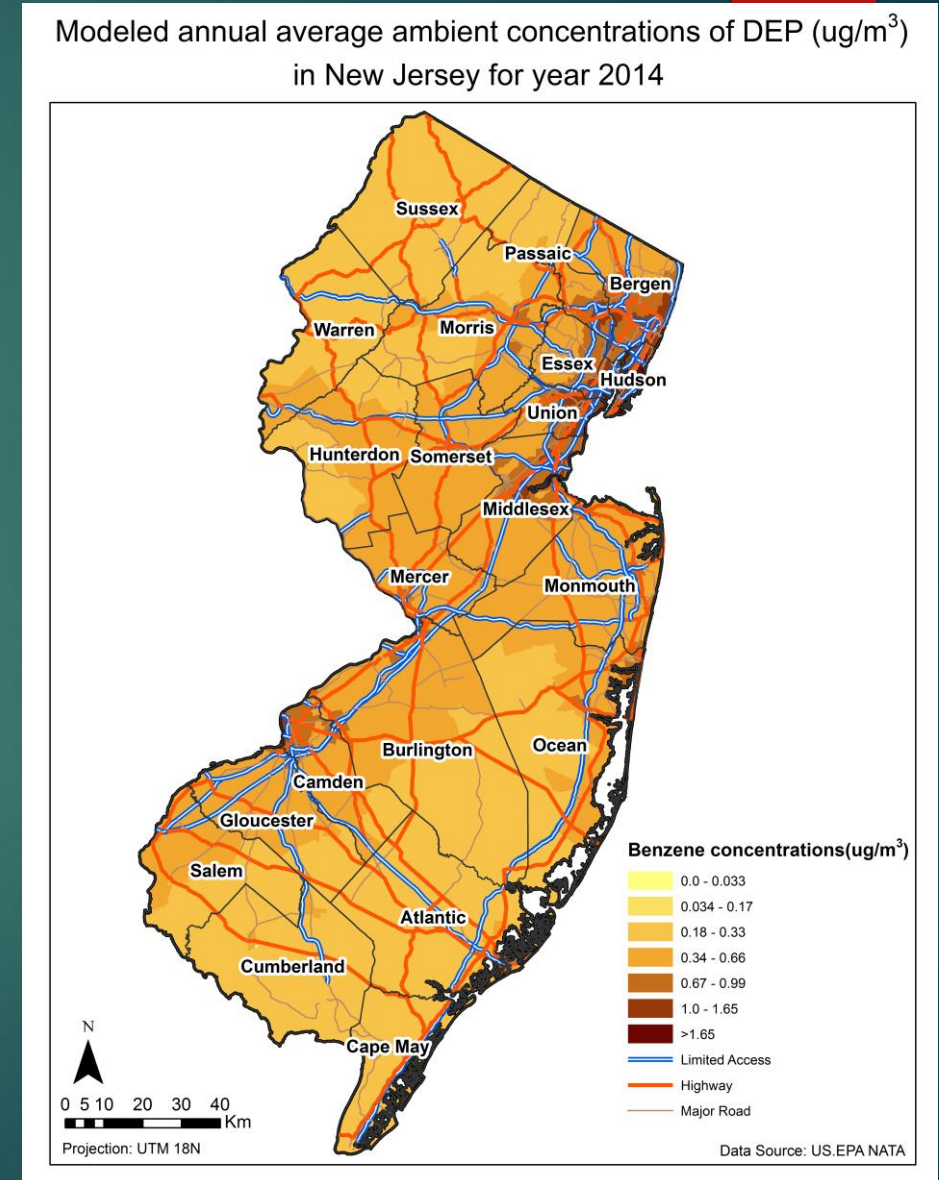
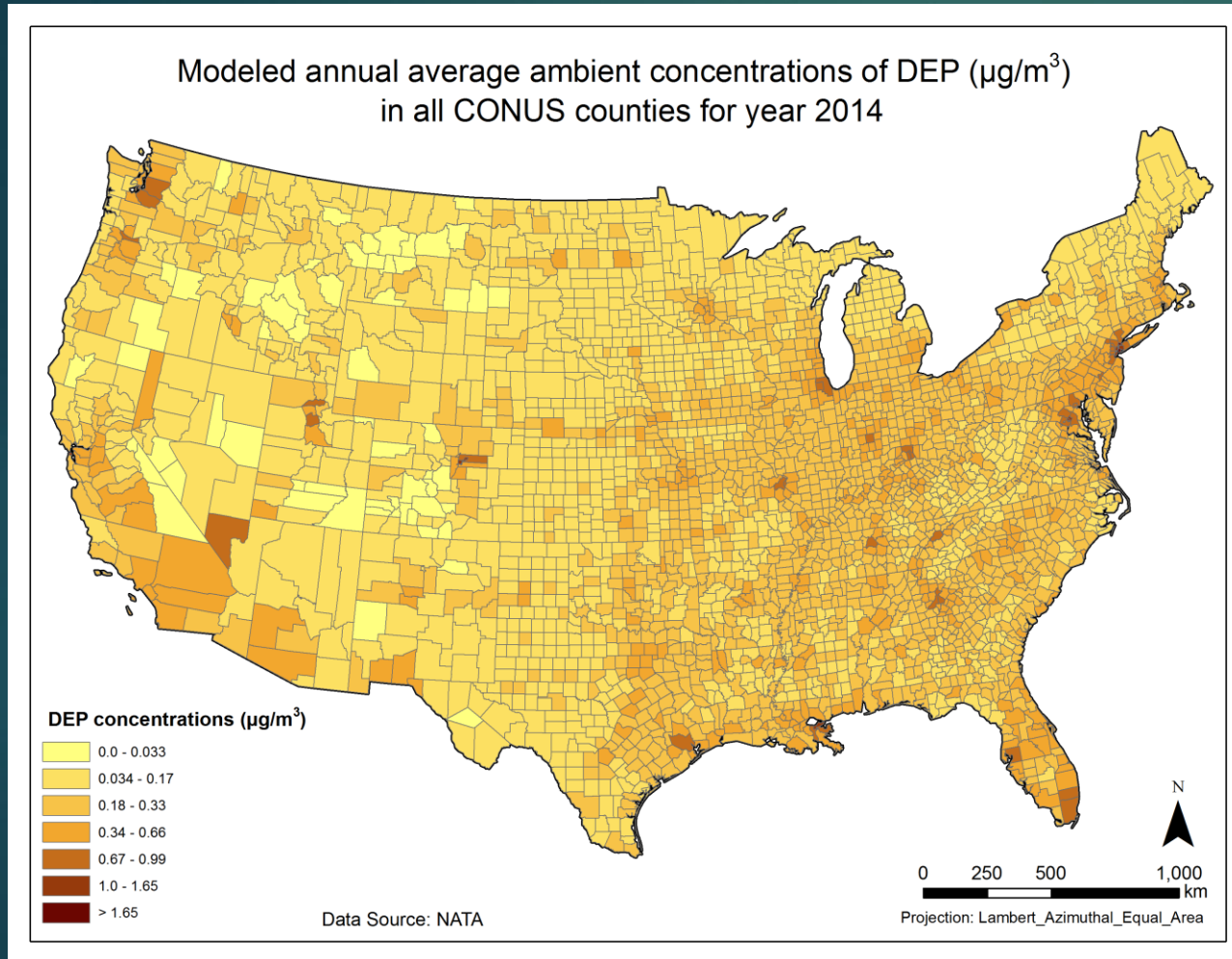
However, levels of air toxics (HAPs) remain **among the highest** in the US

2014 Percentile Rank for Airborne Concentrations of			
COUNTY	DEP	Benzene	Formaldehyde
Atlantic	83.4	85.3	41.2
Bergen	99.1	99.3	56.2
Burlington	96	96.9	54.3
Camden	98	98.1	55.9
Cape May	77.6	78.3	28.4
Cumberland	82.7	85.9	45.9
Essex	98.9	99.2	57.4
Gloucester	94.4	96.1	51
Hudson	99.9	99.6	66.8
Hunterdon	91.5	96.3	45
Mercer	97.5	97.8	52.2
Middlesex	98.5	98.1	54.7
Monmouth	97.2	95.1	45.5
Morris	93.6	95	45.1
Ocean	94	93	42.5
Passaic	98.4	98.8	52.9
Salem	92.1	91.5	47
Somerset	96.5	97.2	50.2
Sussex	72.6	91.4	38
Union	99.1	98.8	57.3
Warren	88.1	95.9	43.7

HAPs: Hazardous Air Pollutants; DEP: Diesel Exhaust Particles
 Data Sources: USEPA (NATA, 2018 release) and NJDEP



New Jersey, and in particular the Newark/Elizabeth area, have some of the highest Diesel Exhaust Particle (DEP) air levels in the US

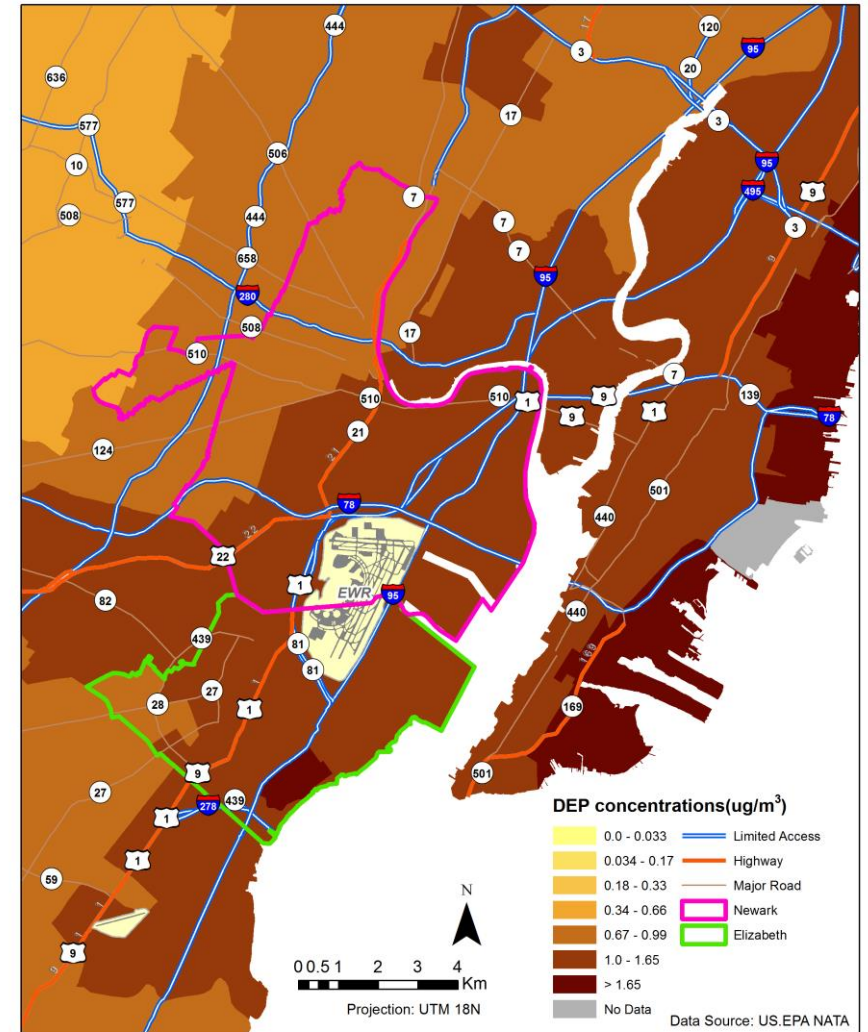


Note: map colors are based on multiples of the "California cancer health benchmark" for DEP, $0.0033\mu\text{g}/\text{m}^3$; so 0.34-0.66 $\mu\text{g}/\text{m}^3$ is 100-200 times, 0.67-0.99 is 200-300 times, and 1.0-1.65 is 300-500 times the benchmark

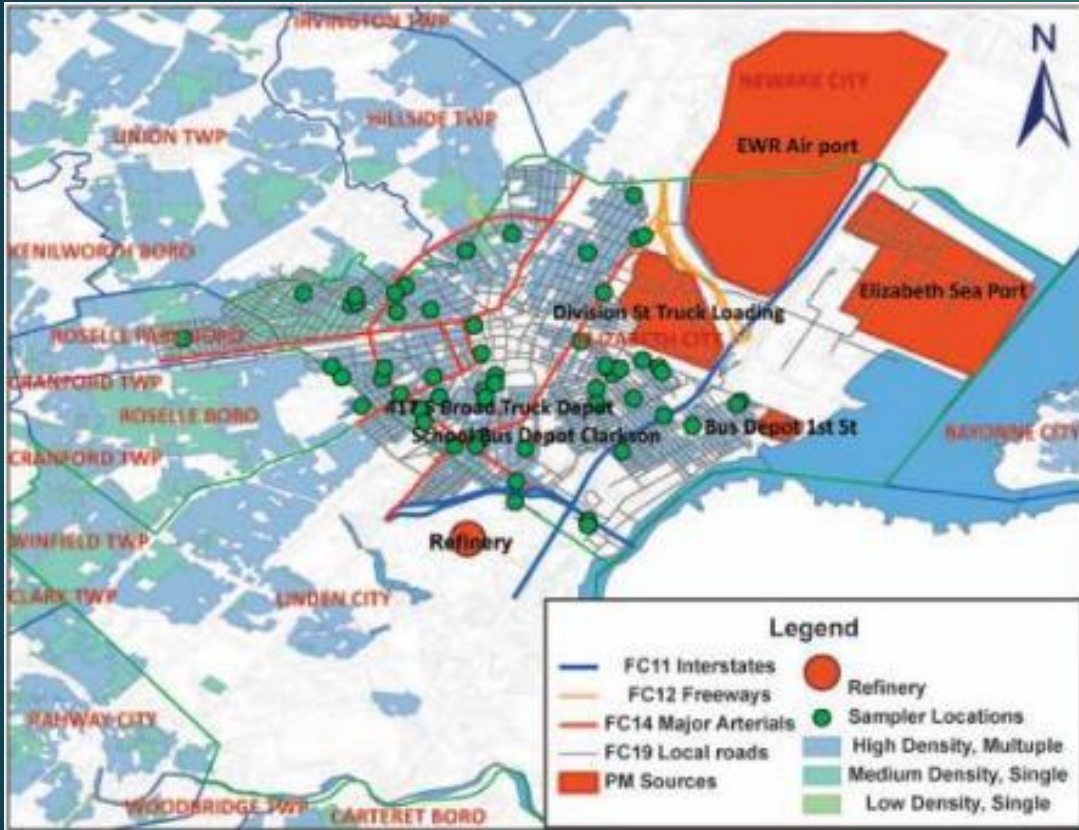
Annual average concentrations across census tracts **do not** capture the high levels caused by **proximity** of urban populations to sources



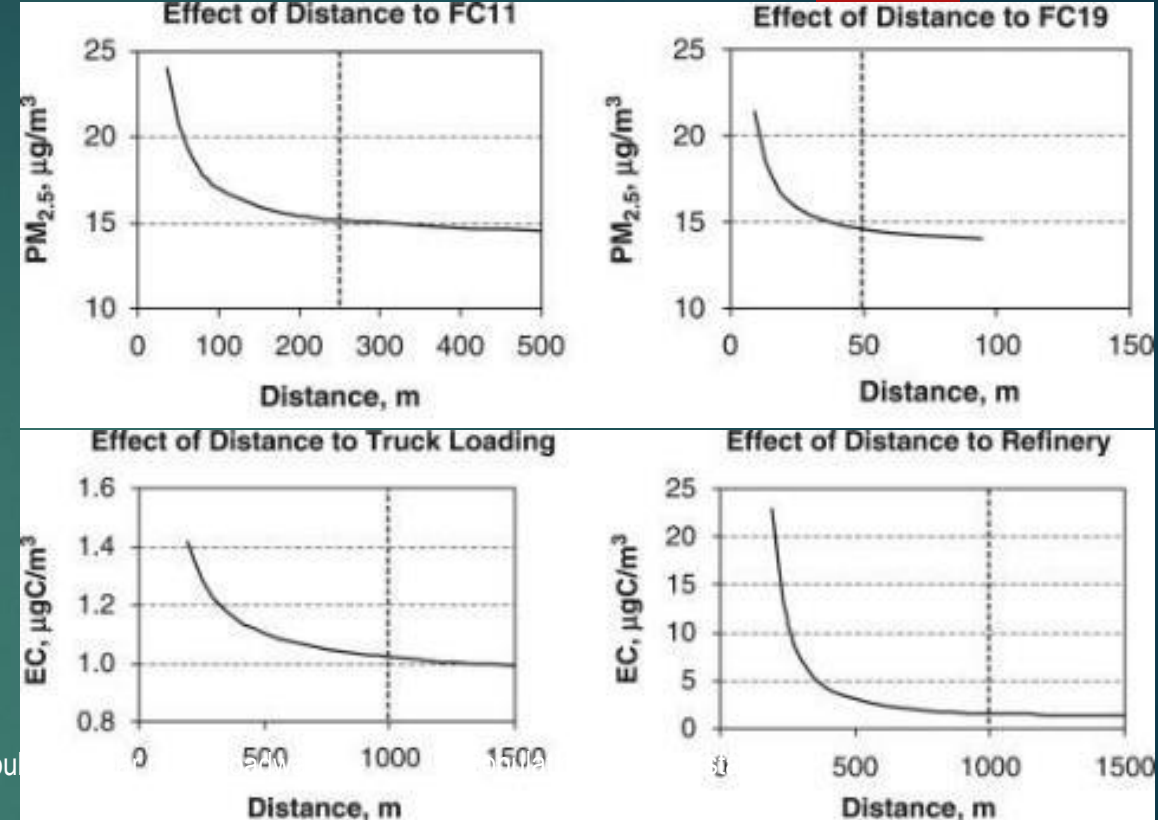
Modeled annual average ambient concentrations of DEP ($\mu\text{g}/\text{m}^3$) in Newark / Elizabeth and surrounding areas for year 2014



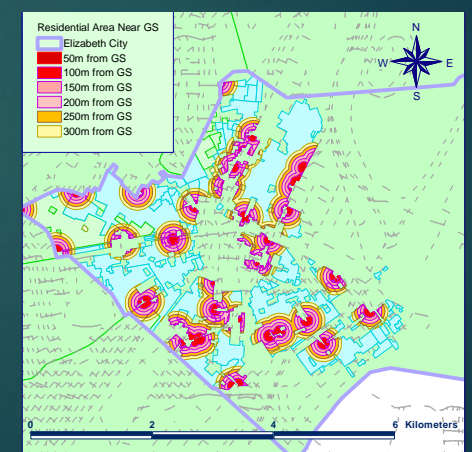
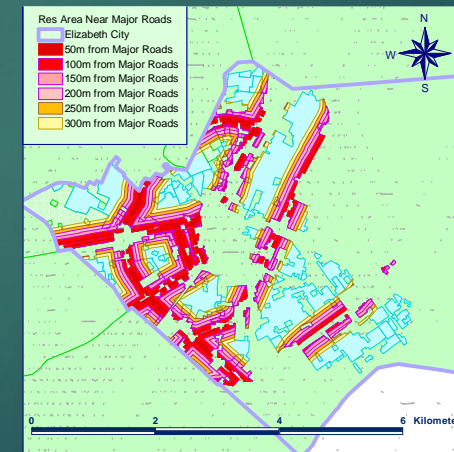
An EOHSI field study in Elizabeth demonstrated the importance of **proximity** to sources of pollutants



- Study results published in JESEE (2010) 20, 457-468
- FC11: interstate roadways; FC19: local roadways
- EC: elemental carbon (representative of DEP)



Popu



~7% of the population of Elizabeth lives within 50m from sources of toxic air pollutants; air concentrations there are 50-500% higher than urban backgro



Melissa Miles

Environmental Justice Manager, Ironbound
Community Corporation, Newark NJ

VISIONARY COMMUNITY SOLUTIONS to Environmental Racism

Melissa Miles

Environmental Justice Manager

Ironbound Community Corporation

mmiles@ironboundcc.org

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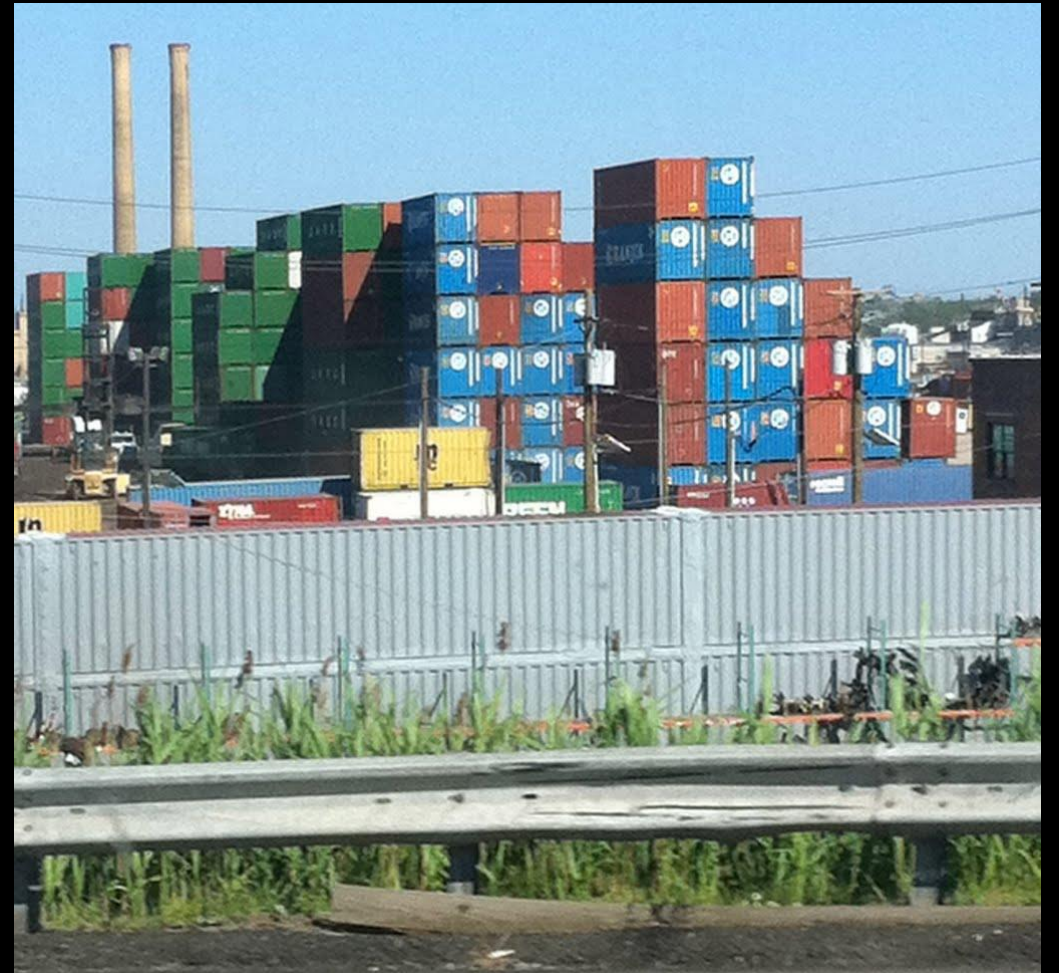
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climate crisis - a Just Trans...
energy economy to local, living...
economies rooted in social...

ion campaigns at the local...
for Power Communities. W...
Mesa, Arizona; Detroit, Mich...
ornia; Eastern Kentucky; Ja...

Richmond
San Antonio

IRONBOUND RESISTANCE
SAY NO TO NEWARK DUMPS



Coalitions and Partnerships



Greening our community



Intersectionality and solidarity



Empowering Youth



Local sustainable businesses



Growing our own food



Education in Action



Working together





Cooking and eating together in community





Discussion





Summary: A Call to Action