

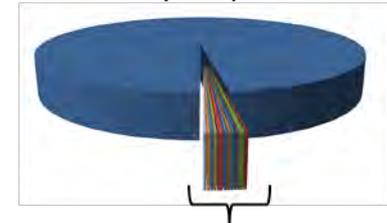


Who's Leading the Leading Health Indicators?

Leading Health Indicators are:

- Critical health issues that, if addressed appropriately, will dramatically reduce the leading causes of preventable deaths and illnesses.
- Linked to specific Healthy People objectives.
- Intended to motivate action to improve the health of the entire population.

1200 Healthy People measures



LHIs are a subset
of Healthy People
measures



Who's Leading the Leading Health Indicators?

Featured Speakers:

- **Wanda Jones, DrPH**

Acting Assistant Secretary for Health, U.S.
Department of Health and Human Services

- **Steven Kleeberger, Ph.D.**

Director, Environmental Genetics Group, Laboratory
of Respiratory Biology, National Institute of
Environmental Health Sciences, National Institutes of
Health

- **Virginia Lau, MS**

Advanced Projects Advisor , Bay Area Air Quality
Management District, California



Environmental Quality

- What is environmental quality?
 - The WHO defines environment, as it relates to health, as “all the physical, chemical, and biological factors external to a person, and all the related behaviors”
- Impact on the population
 - Globally, nearly 25% of all deaths and the total disease burden can be attributed to environmental factors



Environmental Quality Leading Health Indicators

- Air Quality Index (AQI) exceeding 100
- Children aged 3 to 11 years exposed to secondhand smoke





Environmental Quality

- The environment directly affects health status and plays a major role in quality of life, years of healthy life lived, and health disparities. Specifically, poor air quality is linked to:
 - Asthma
 - Aggravation of respiratory and cardiovascular disease
 - Decreased lung function
 - Increased frequency, severity and susceptibility to respiratory symptoms
 - Effects on the nervous system, including the brain, such as IQ loss and impacts on learning, memory and behavior
 - Cancer
 - Premature death

Importance of Addressing Air Quality

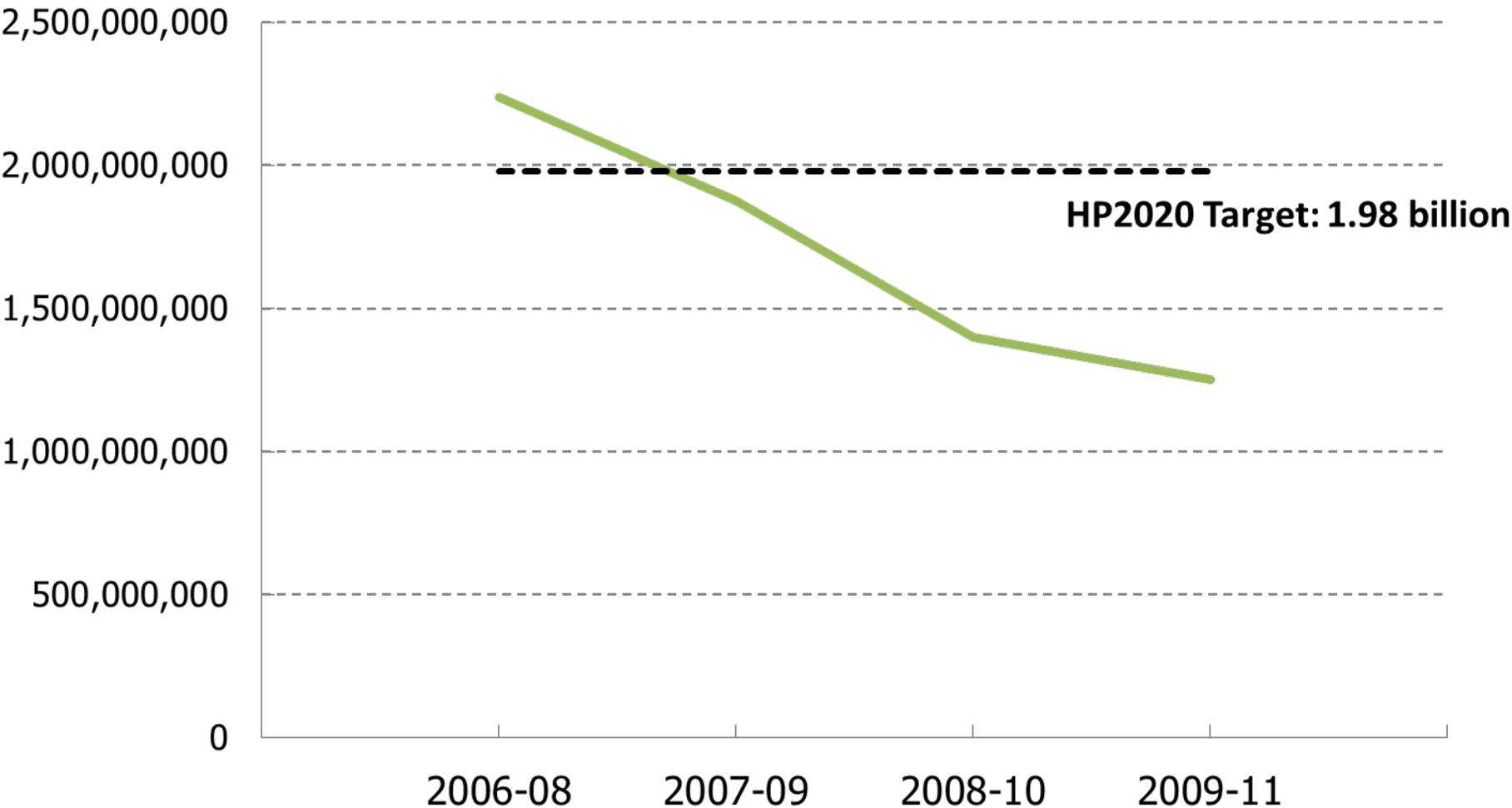


Sources and Health Effects of Air Pollution

Pollutant	Sources	Health Effects
Ozone (O₃)	Secondary pollutant typically formed by chemical reaction of volatile organic compounds (VOC _s) and (NO _x) in the presence of sunlight	Decreases lung function and causes respiratory symptoms, such as coughing and shortness of breath; aggravates asthma and other lung diseases leading to increased medication use, hospital admissions, emergency department (ED) visits, and premature mortality.
Particulate Matter (PM)	Emitted or formed through chemical reactions; fuel combustion (e.g., burning coal, wood, diesel); industrial processes; agriculture (plowing, field burning); and unpaved roads.	Short-term exposures can aggravate heart or lung diseases leading to respiratory symptoms, increased medication use, hospital admissions, ED visits, and premature mortality; long-term exposures can lead to the development of heart or lung disease and premature mortality.
Lead	Smelters (metal refineries) and other metal industries; combustion of leaded gasoline in piston engine aircraft; waste incinerators; and battery manufacturing	Damages the developing nervous system, resulting in IQ loss and impacts on learning, memory, and behavior in children. Cardiovascular and renal effects in adults and early effects related to anemia.
Oxides of Nitrogen (NO_x)	Fuel combustion (e.g., electric utilities, industrial boilers, and vehicles) and wood burning.	Aggravate lung diseases leading to respiratory symptoms, hospital admissions, and ED visits; increased susceptibility to respiratory infection.
Carbon Monoxide (CO)	Fuel combustion (especially vehicles)	Reduces the amount of oxygen reaching the body's organs and tissues; aggravates heart disease, resulting in chest pain and other symptoms leading to hospital admissions and ED visits.
Sulfur Dioxide (SO₂)	Fuel combustion (especially high-sulfur coal); electric utilities and industrial processes; and natural sources such as volcanoes.	Aggravates asthma and increased respiratory symptoms. Contributes to particle formation with associated health effects.

Exposure to Unhealthy Outdoor Air

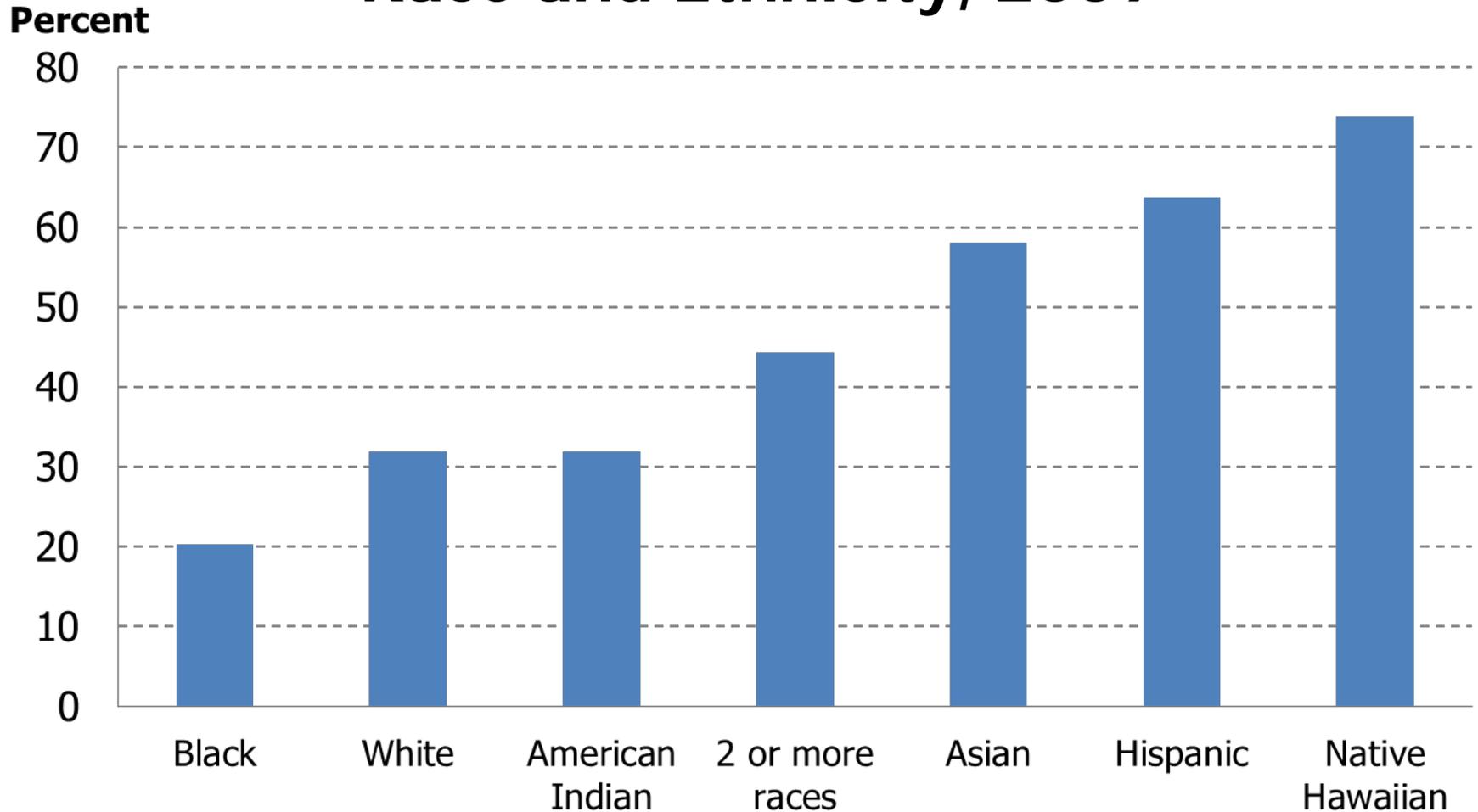
**AQI-weighted
People Days**



NOTES: The AQI weight is the proportion of the AQI greater than 100. The population of an area is multiplied by the AQI weight to produce weighted people-days. All areas with an AQI greater than 100 are summed by AQI-weighted people-days for each year and averaged for the 3-year period. Estimates for this objective are restricted to the contiguous United States.
SOURCE: Air Quality System (AQS), EPA.

Obj. EH-1
Decrease desired

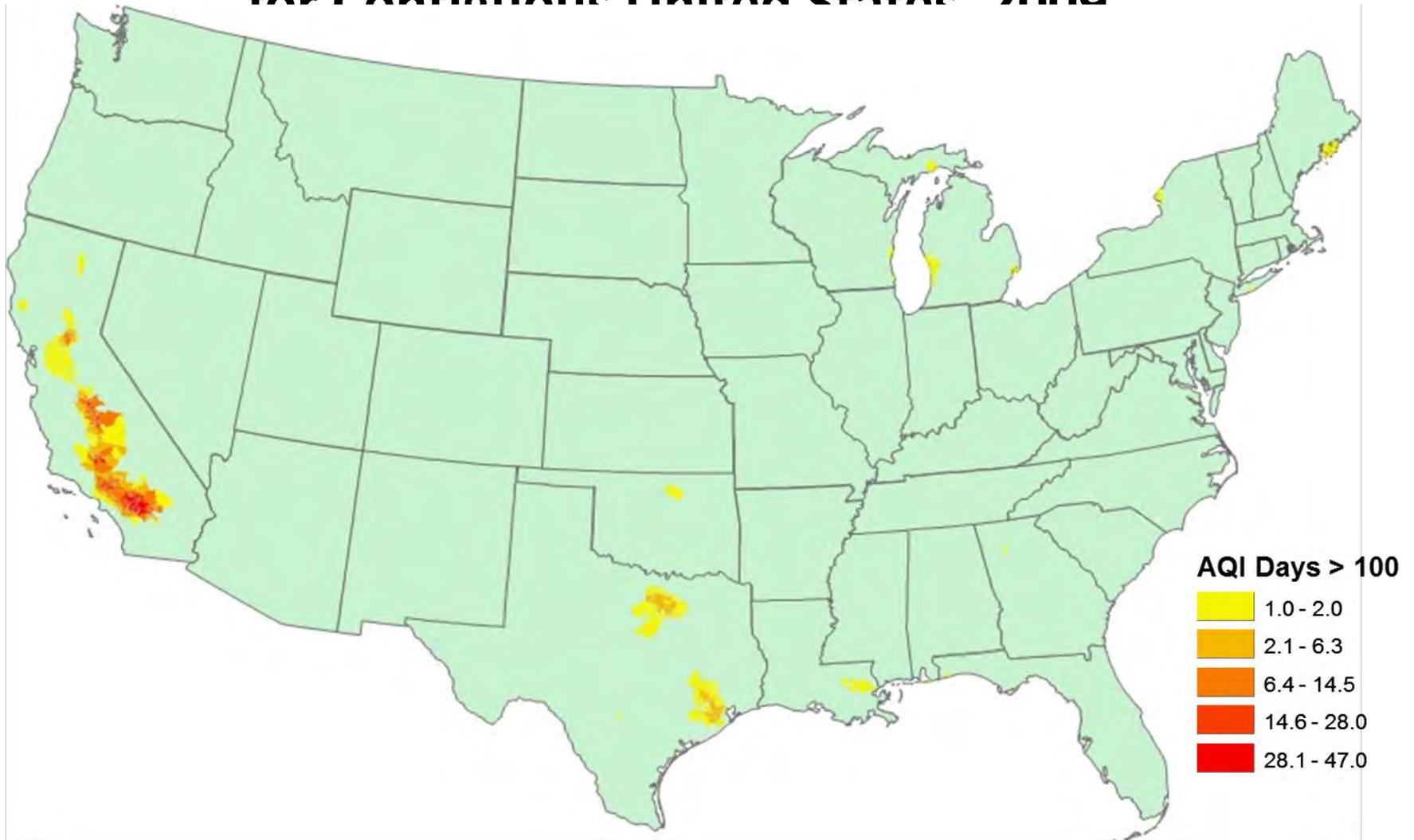
Exposure to Unhealthy Air Quality by Race and Ethnicity, 2009



NOTES: Race groups exclude persons of Hispanic origin. Persons of Hispanic origin may be any race. American Indian includes Alaska Native. Native Hawaiian includes Other Pacific Islanders. Respondents were asked to select one or more races. Single race categories are for persons who reported only one racial group. Estimates are based on Bayesian space-time downscaling fusion model (downscaler, DS) –Derived Estimates of Air Quality for 2009. Air quality monitoring data from the National Air Monitoring Stations/State and Local Air Monitoring Stations (NAMS/SLAMS) and numerical output from the Community Multiscale Air Quality (CMAQ) model were both input into DS to predict concentrations at the 2010 US census tract centroids encompassed by the CMAQ modeling domain.

SOURCE: Air Quality System (AQS), EPA.

Weighted Air Quality Index (AQI) Days for Contiguous United States 2009

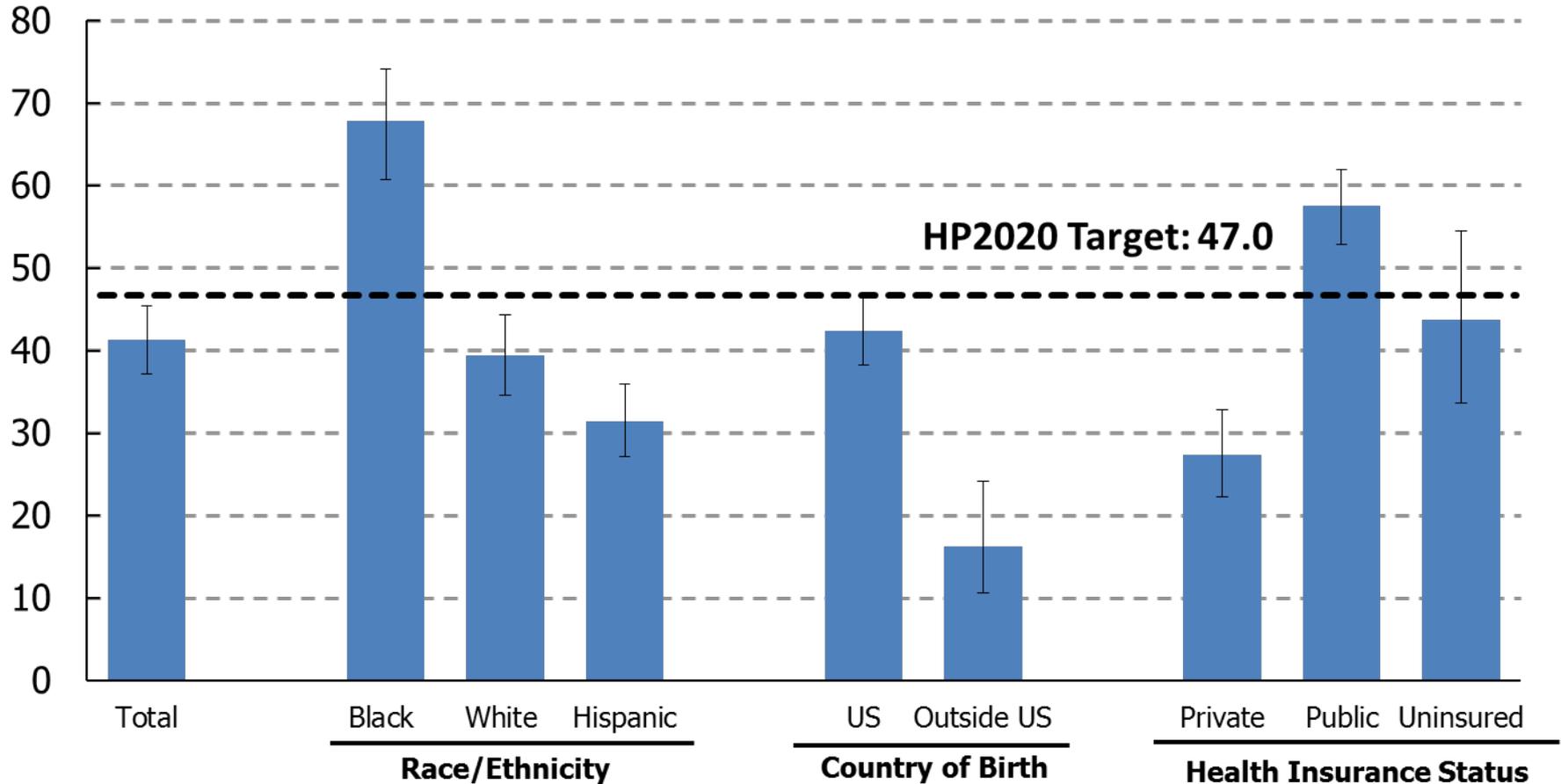


NOTES: Estimates are based on Bayesian space-time downscaling fusion model (downscaler, DS) –Derived Estimates of Air Quality for 2009. Modeled data are only available for the contiguous United States. AQI days are weighted by severity of air quality (e.g., an AQI of 130 counts as 1.3 days, and an AQI of 250 counts as 2.5 days).

SOURCE: Air Quality System (AQS), EPA.

Exposure of non-smokers to secondhand smoke, ages 3 to 11, 2009–2012

Percent



NOTES: I= 95% confidence interval. Children aged 3-11 years are considered to be non-smokers if they had a serum cotinine level of less than or equal to 10 ng/ml. Children are considered to be exposed to second hand smoke if they had a cotinine level greater than or equal to 0.05ng/ml and less than or equal to 10 ng/ml. Black and White exclude persons of Hispanic origin. Persons of Hispanic origin may be any race. Respondents were asked to select one or more races. Single race categories are for persons who reported only one racial group.
 SOURCE: National Health and Nutrition Examination Survey (NHANES), CDC/NCHS

Obj. TU-11.1
 Decrease desired

Steven R. Kleeberger, Ph.D. Director, Environmental Genetics Group National Institute of Environmental Health Sciences (NIEHS)





National Institute of Environmental Health Sciences (NIEHS)

- One of the Institutes of the National Institutes of Health (NIH)
- *The NIEHS Mission:* to reduce the burden of human illness and disability by understanding how the environment influences the development and progression of human disease.





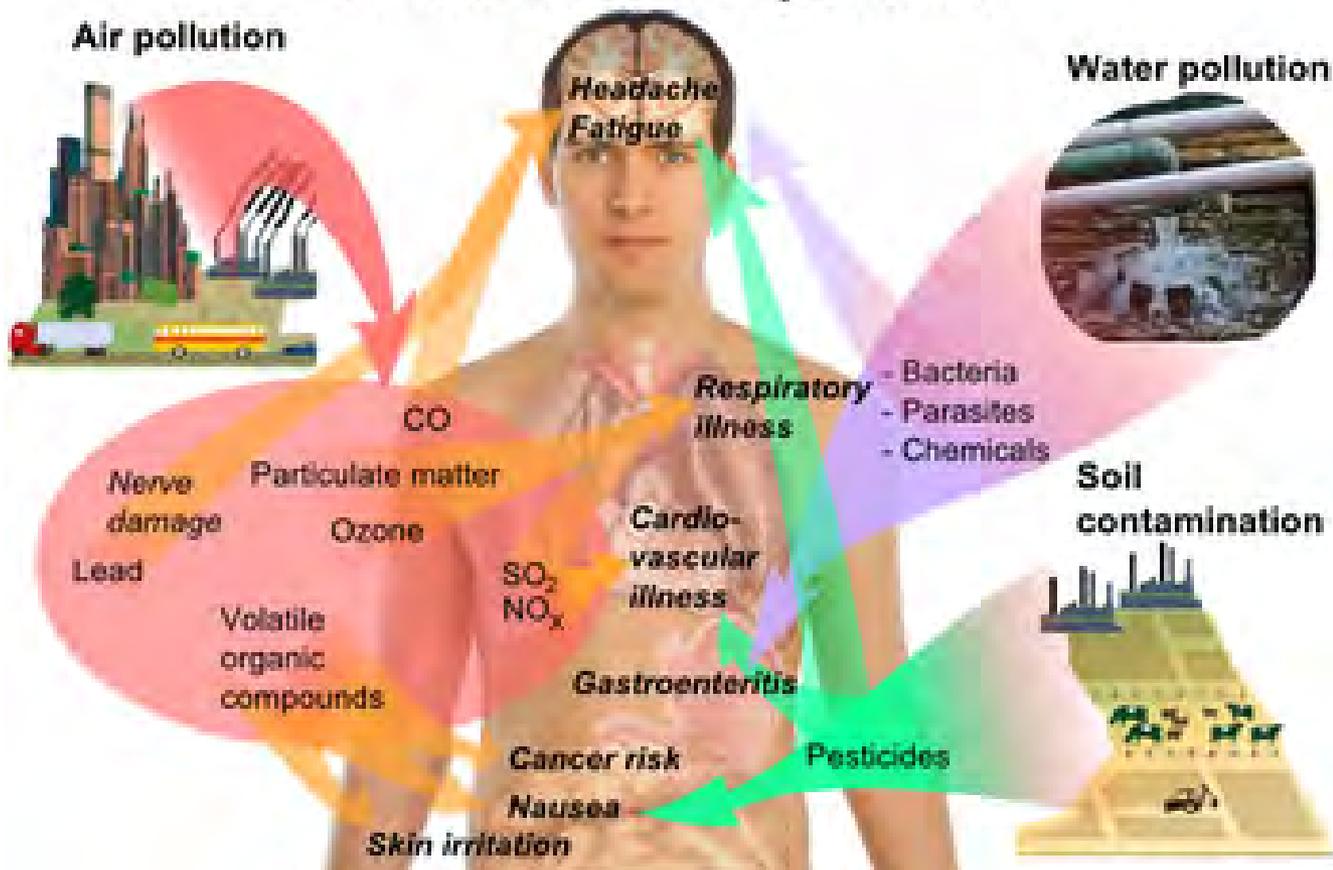
NIEHS research

- The NIEHS has focused intramural and extramural research efforts on understanding the adverse pulmonary responses to environmental exposures, and factors that may contribute to differential susceptibility to the exposures.
- Environmental exposures under study include criteria pollutants identified by the Environmental Protection Agency, including ozone and particulate matter.

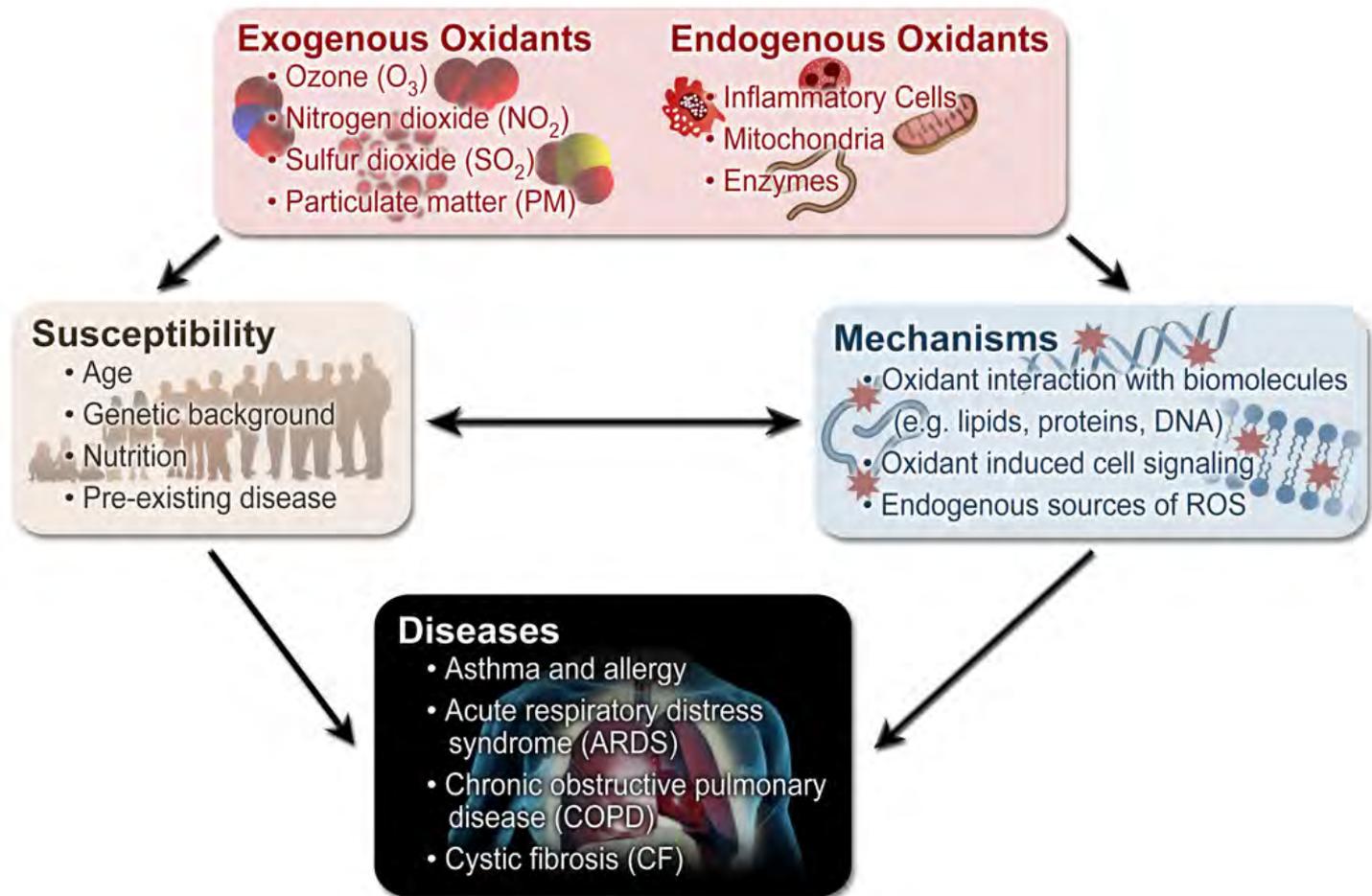


Adverse outcomes associated with exposure to criteria pollutants

Health effects of pollution

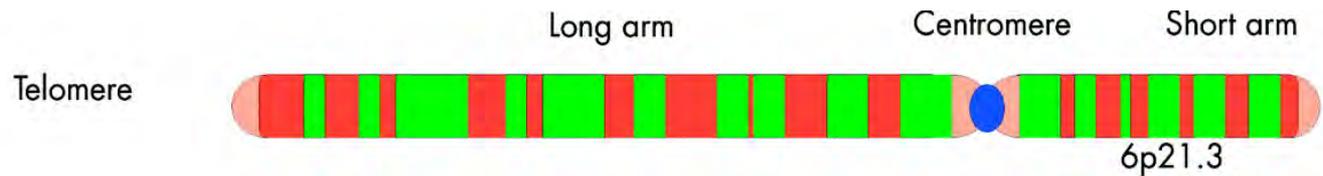


Risk factors that contribute to variation in susceptibility to biological effects of air pollutants.



Genetic factors contribute to differential response to ozone exposure

Genes within the histocompatibility complex on human chromosome 6 and mouse chromosome 17 have associated with adverse responses to ozone exposure in laboratory and epidemiological investigations.

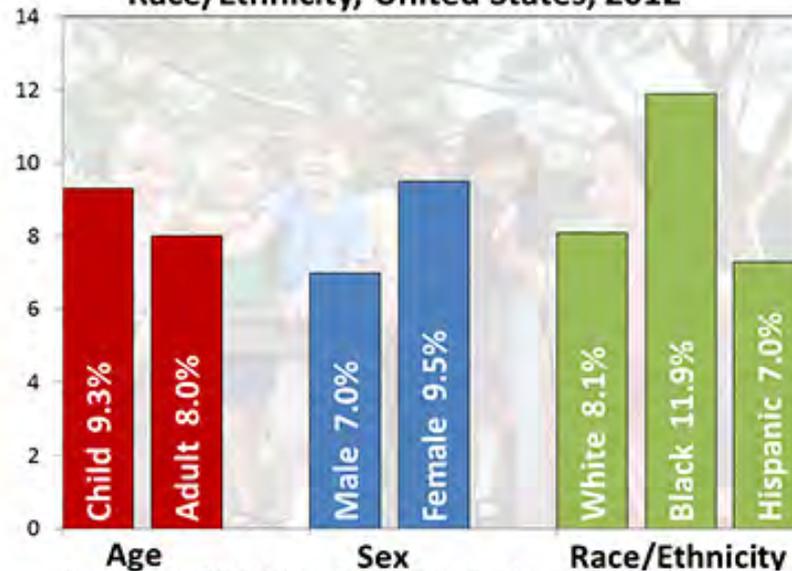


NIEHS research

- The NIEHS has also focused on the contribution of environmental agents in the development and exacerbation of pulmonary diseases, including asthma.



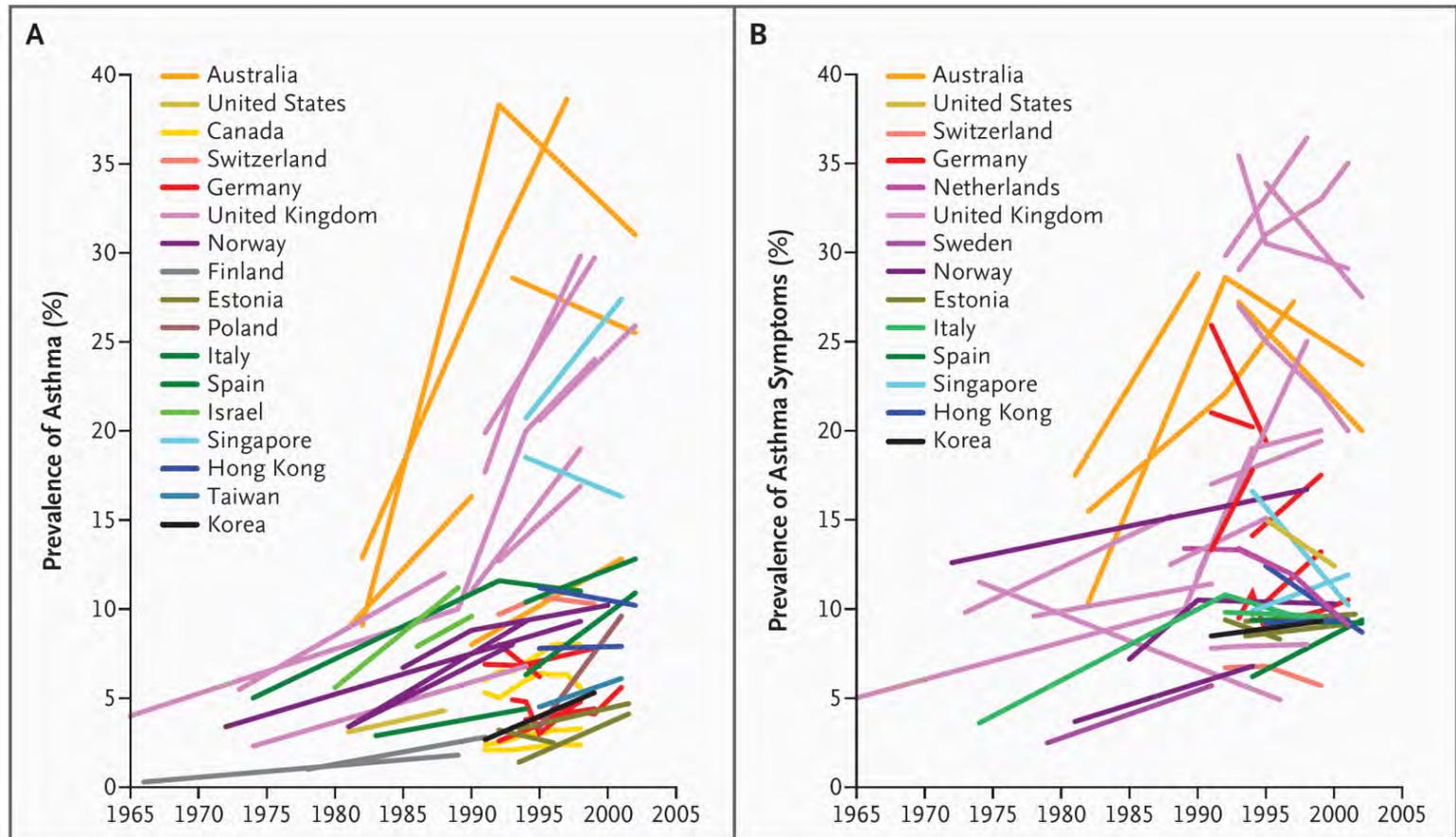
Current Asthma Prevalence Percents by Age, Sex, and Race/Ethnicity, United States, 2012



Source: National Health Interview Survey, National Center for Health Statistics, Centers for Disease Control and Prevention



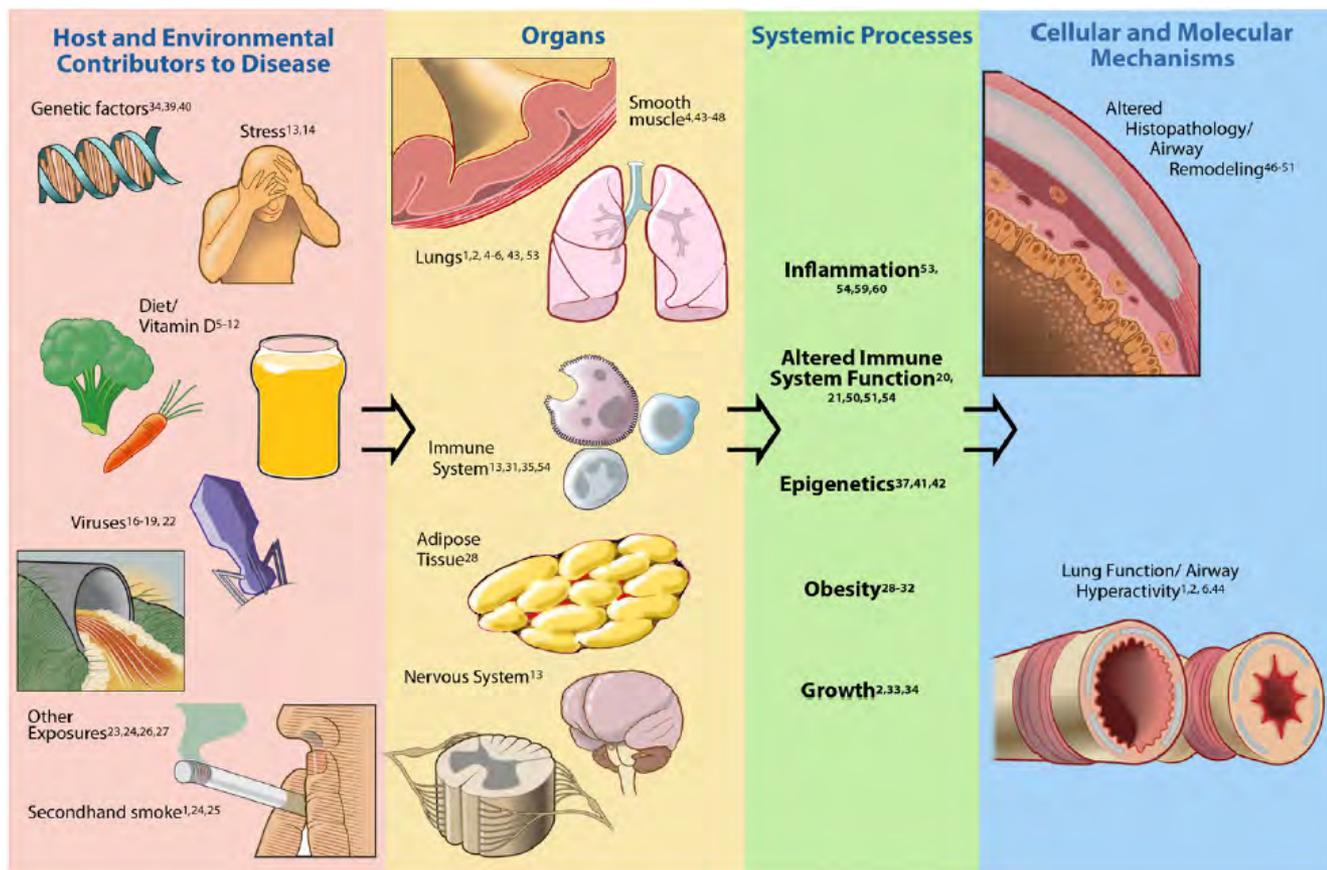
Global changes in the prevalence of diagnosed asthma and asthma symptoms over time in children and young adults



Eder et al, *NEJM* 2006

What is causing the increase in asthma prevalence in industrialized countries throughout the world?

- Indoor allergens, genetics, and outdoor air all play a role





NIEHS asthma research

The NIEHS research program supports a broad range of asthma research including basic science, epidemiology, and clinical research.

Projects include:

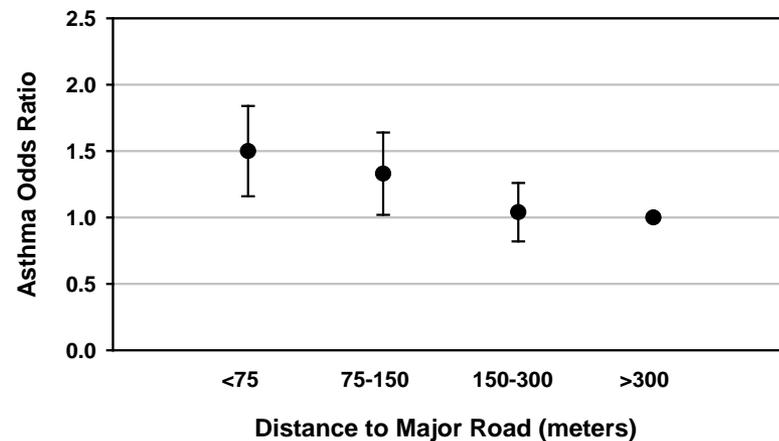
- **the relationship between indoor allergens and endotoxin exposures**
- **intervention efforts such as reduction of dust mites in homes of children who are sensitive or allergic to dust mites**
- **epidemiologic studies of genetic susceptibility to asthma in a highly ozone exposed population and asthma in a large cohort of agricultural workers.**

NIEHS asthma research

- NIEHS-funded researchers found that children living within 150 meters of a freeway were more likely to be diagnosed with asthma than children who lived further away.



Association of prevalent asthma with distance to a major road



Modified from McConnell et al, 2006

Additional NIEHS research initiatives

- NIEHS supports the *Well Being Project* - an ongoing community-academic partnership to optimize asthma health among farm workers' children. Goal: identify environmental factors, such as pesticides, agricultural dusts, and pollen that trigger asthma in rural, farm working populations.
- NIEHS funded research has determined that when children walk into their school building, they may pass through some of the dirtiest air on their travel from home to class. This research provides strong support for effective *anti-idling campaigns near schools*.





My Air, My Health Challenge

- In June of 2012, NIEHS helped kick off the My Air, My Health Challenge , a year-long competition to develop a personal air pollution sensor.
- The project came to a close in June 2013 when the company, Conscious Clothing, was awarded the My Air grand prize of \$100,000 for its proposed design and product development plan.





Improving Air Quality in West Oakland, California

Healthy People 2020: Environmental Quality
September 18, 2014

Virginia Lau
Advanced Projects Advisor
Bay Area Air Quality Management District
Email: vlau@baaqmd.gov
(415) 749-4696

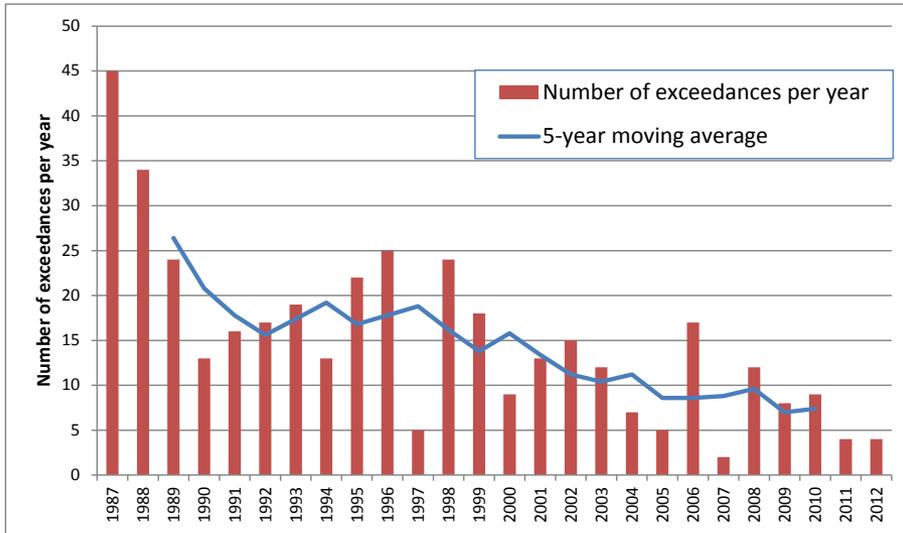


Acknowledgements

- West Oakland Environmental Indicators Project (WOEIP)
- West Oakland residents
- Bay Area Rapid Transit (BART)
- California Air Resources Board (CARB)
- Custom Alloy Scraps Sales (CASS)
- Desert Research Institute (DRI)
- Lawrence Berkeley National Laboratory (LBNL)
- Port of Oakland (Port)
- Sonoma Technology Inc (STI)
- University of California Berkeley (UCB)
- Wiltec

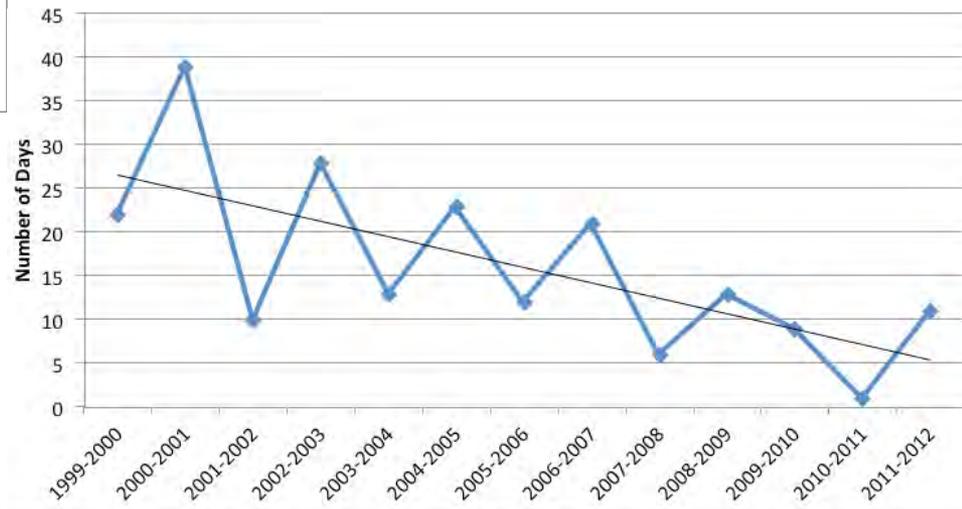


Air Quality Trends



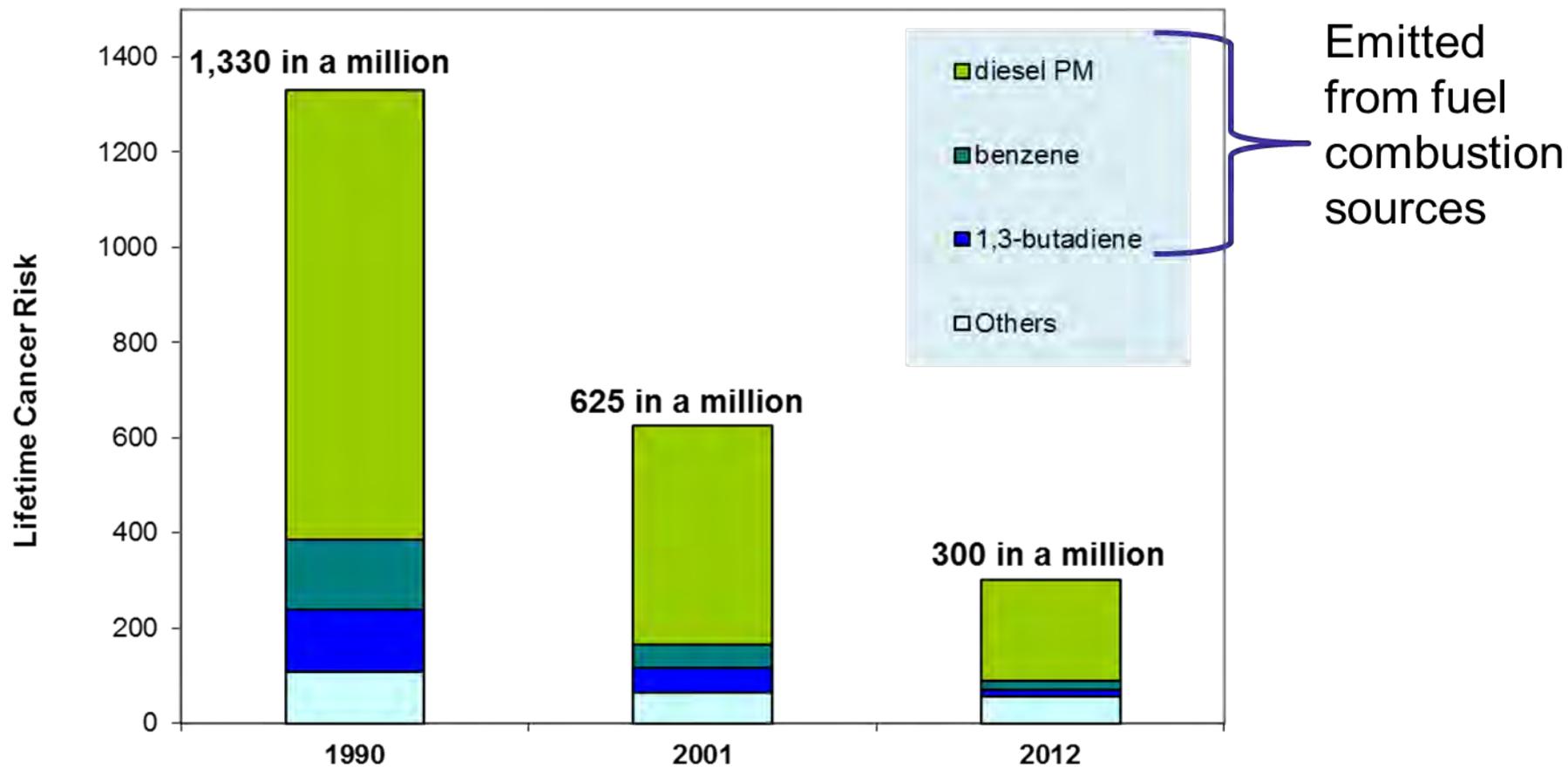
Days/year over national 8-hour ozone standard

Winter days over national 24-hour PM_{2.5} standard





Regional Cancer Risks



But Air Quality Challenges Remain

- Some communities have higher air pollution exposures and health impacts
- Near-source exposures of particles and toxic air contaminants are important



Sources of Emissions in West Oakland, California



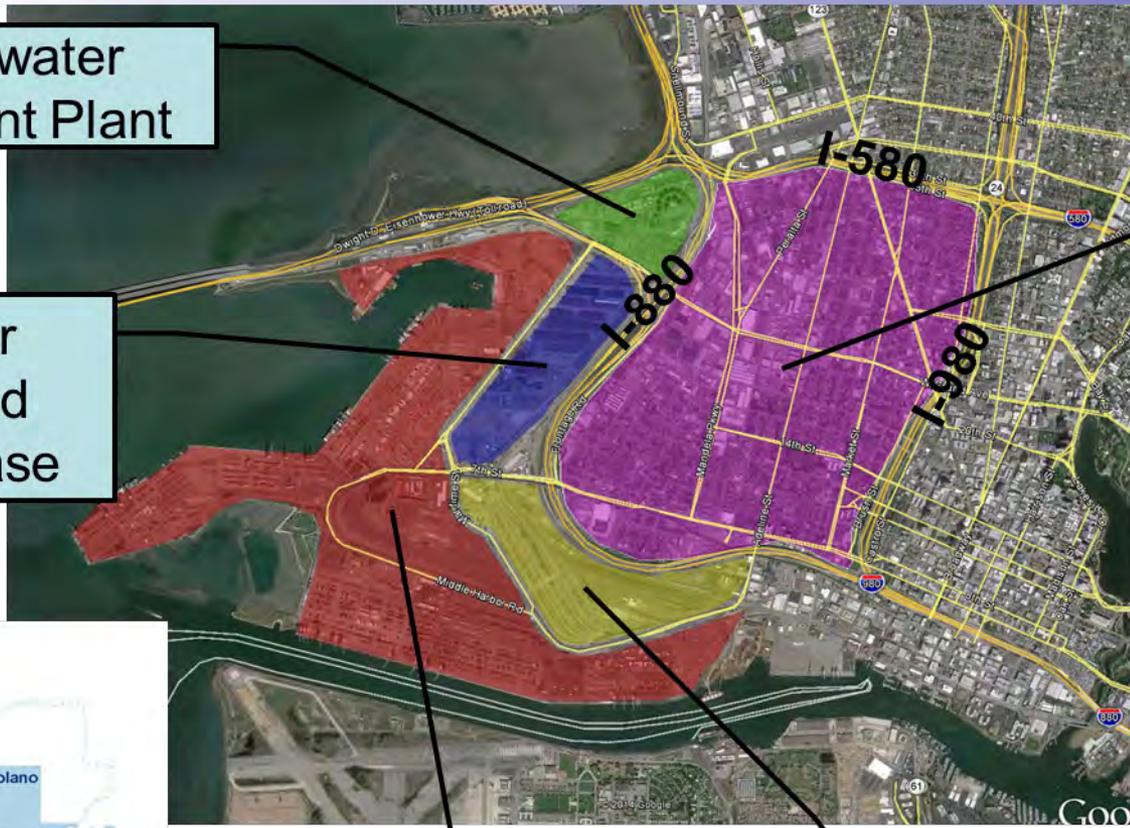
Wastewater Treatment Plant

Former Oakland Army Base

West Oakland Community (22,000 residents)

Port of Oakland

Union Pacific Railyard

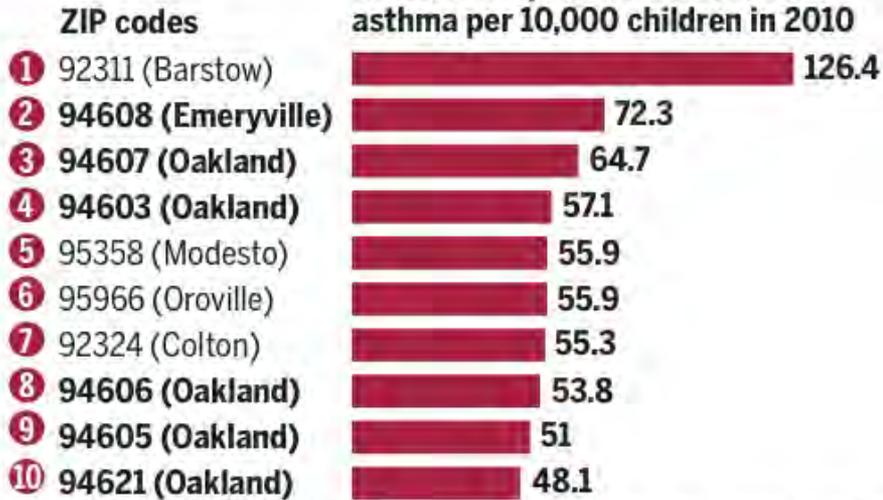




Health of West Oakland Residents

- Childhood Asthma:
- Top 10 hospital admission rates

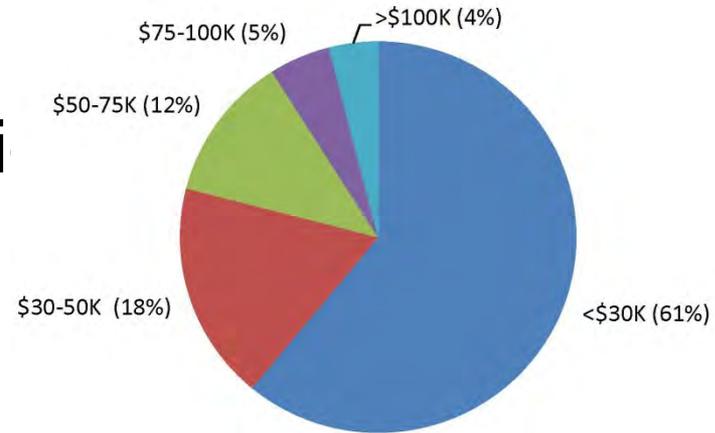
Rates of hospital admissions for asthma per 10,000 children in 2010



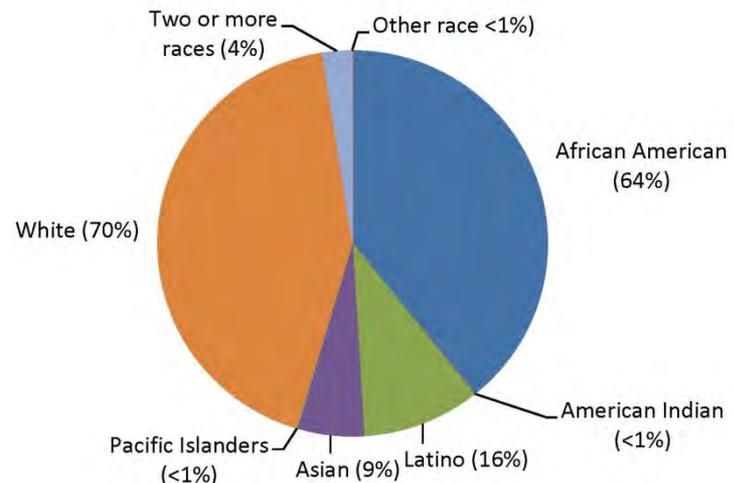
Source: <http://californiabreathing.org>

BAY AREA NEWS GROUP

Income (1999)



Demographics (2000)



Public Health Impacts of Local Risks and Hazards

- Recent health studies have consistently shown that living near highways and busy roadways have serious health consequences:
 - Children are 60% more likely to develop asthma and wheezing
 - Pregnant women may experience problems with their baby's development, such as low birth weight
 - Residents have significantly higher risks of heart attacks and premature death.



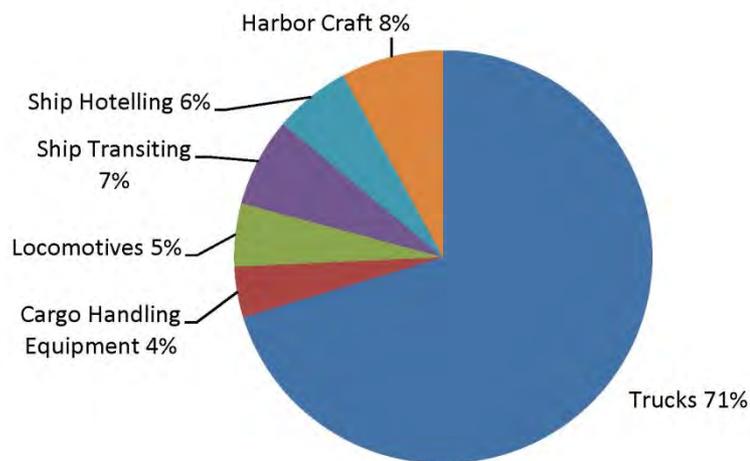
Diesel Particulate Matter (PM)

- Diesel PM is comprised of fine PM soot containing nitrogen oxides (NO_x), oxides of sulfur (SO_x), and polycyclic aromatic hydrocarbons (PAHs)
- California Air Resources Board (CARB) identified diesel PM as a toxic air contaminant in 1998
- Exposure to diesel PM contributes to respiratory problems and premature death
- More than 85% of the total inventoried cancer risk is attributed to diesel PM



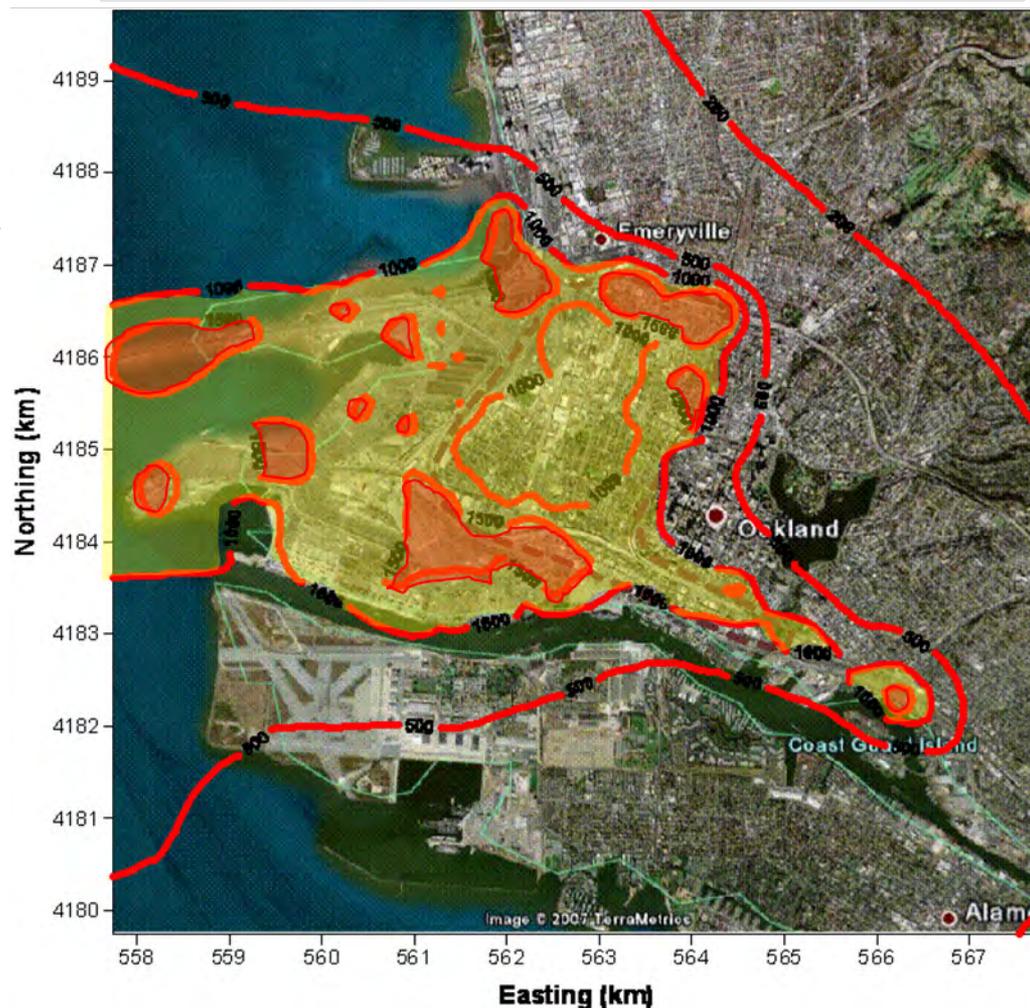
Health Risk Assessment (2008)

- CARB estimated potential cancer risk in 2005 from all major diesel sources in West Oakland
- Major finding: Risk (1,200 in million) about three times higher than Bay Area average



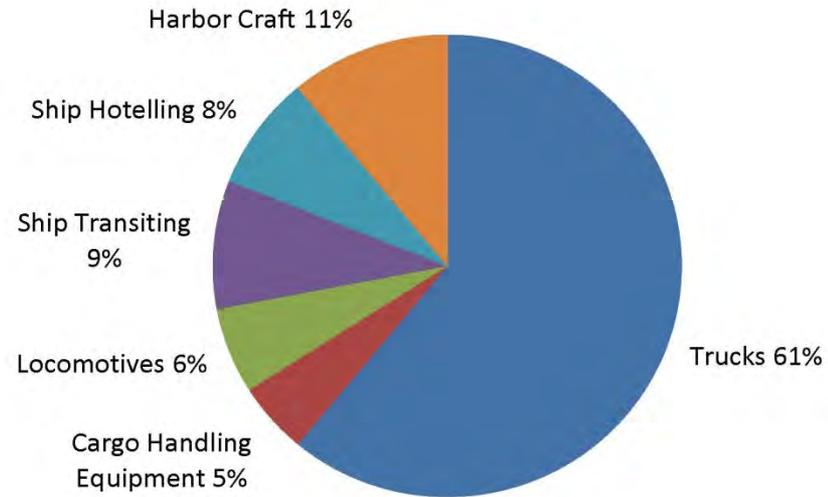
- Recommended additional study on truck volumes and routes

Modeled Potential Cancer Risk



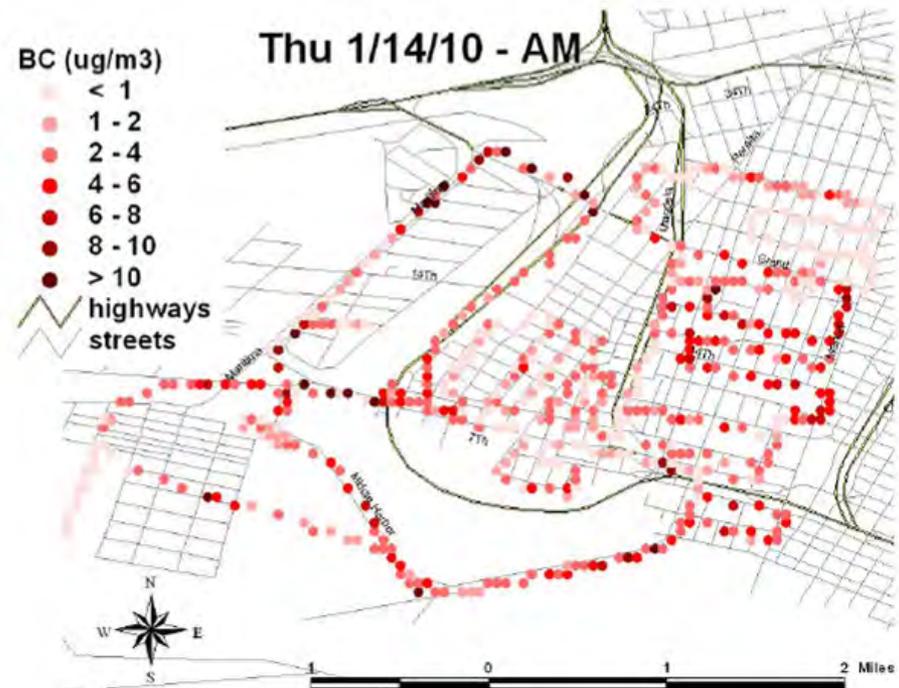
West Oakland Truck Survey (2009)

- Community members and Bay Area Air District staff counted trucks at 38 locations for 2 weeks in August 2008:
 - Trucks are the primary source of diesel-related health risks
 - Fewer trucks on surface street than estimated in health risk assessment
 - Overall cancer risk was adjusted from 1200 cases in a million to 870 cases per million
 - Higher fraction of Port trucks in West Oakland
- Continued cleanup of trucks remained a priority



West Oakland Monitoring Study (WOMS, 2010)

- Collected PM and gaseous measurement using stationary and mobile samplers:
 - Toxic air contaminants in West Oakland were consistent with other Bay Area cities
 - Pollutant concentrations are significantly higher (two to five times higher) on major roads used by diesel trucks
 - Diesel PM is significant fraction of total PM in West Oakland
 - PM concentrations were about half of the HRA modeled 2005 concentrations



Recycling Operation Monitoring (2010)

- Conducted year long monitoring project (2009-2010) near recycling operation in West Oakland
- Monitors collected fine PM and metals concentrations at seven locations
- Results indicate that PM concentrations near recycling facility was consistent with the rest of the Bay Area
- Certain metals such as manganese and lead were higher in West Oakland, but at concentrations below reference exposure levels and federal standard





California's Diesel Regulations

- Drayage Trucks:
 - As of January 2014, all drayage trucks must have 2007 or newer year engines to serve California's ports or rail yards.
 - By 2023, all drayage trucks must have 2010 or newer engines.
- In-Use On-Road Trucks:
 - Diesel trucks and buses must reduce exhaust emissions by meeting particulate matter filters requirements and upgrading to 2010 model year or newer engines (various years of compliance)
- Off-road Equipment:
 - Fleet wide average reductions on NOx and PM emissions based on the horsepower and the model year of each engine
- Locomotives:
 - Low-sulfur diesel fuel must be used for intrastate diesel-electric locomotives in California (2007)
- Commercial Harbor Crafts within 24 nautical miles of the CA coast:
 - Existing Tier 1 engines will be required to meet Tier 2 or Tier 3 standards

Drayage Truck Plume Study (2011)

- Collect plume measurements before (November 2009) and after the drayage truck rule (June 2010)
- In 2010, Port of Oakland prohibited entrance of any trucks with engines older than 1994
- Study showed:
 - Emission of black carbon decreased by about 50%
 - Emissions of NO_x decreased by about 40% mainly through replacement of older engines
 - Reductions in black carbon are linked to installation of retrofit devices and replacements, grant incentives and enforcement



By 2014, the rule is estimated to reduce PM emissions from state drayage truck fleet by 86% from 2007 baseline levels.



Air District's Enforcement Program

Between 2009 and 2013, the Air District's inspectors conducted over 11,000 inspections on mobile diesel equipment

	2009 starting in September	2010	2011	2012	2013	Total
Portable Equipment		412	188	174	184	958
Commercial Idling		75	930	922	752	2,679
Off-Road Diesel Equipment			85	519	293	897
Harbor Craft	4					4
Drayage Truck Regulation		1,145	2,436	954	597	5,132
Ocean Going Vessels	24		17		27	68
Transport Refrigeration Units		106	647	259	256	1,268
Onboard Incineration	24		17		27	68
Total Inspections	52	1,738	4,320	2,828	2,136	11,074
Violations	0	42	59	92	131	324

Air District's Grant Program

- Air District's grant program provided:
 - Over \$25 million to retrofit and replace 1,522 drayage trucks that operate in West Oakland (2009/2010)
 - \$24 million to install shore-power at 11 berths at the Port
 - Additional \$29 million to replace or retrofit 420 port trucks and 380 on-road trucks that operate around West Oakland



Community Partnerships and Initiatives

- Air District partnered with community members to conduct the Truck Survey
- Residents, local businesses, and schools volunteered for locating measurement study equipment
- Community members provided input on survey locations
- Community members placed “Stop Idling” door hangers and informational pamphlets on parked trucks
- Community members worked with the City of Oakland in establishing truck routes





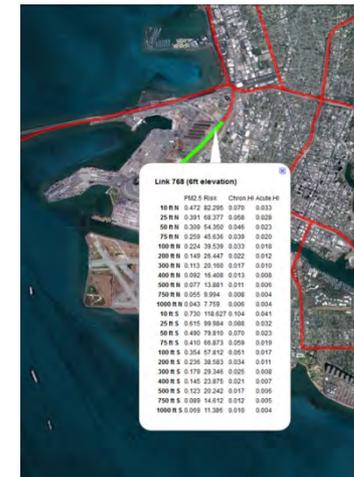
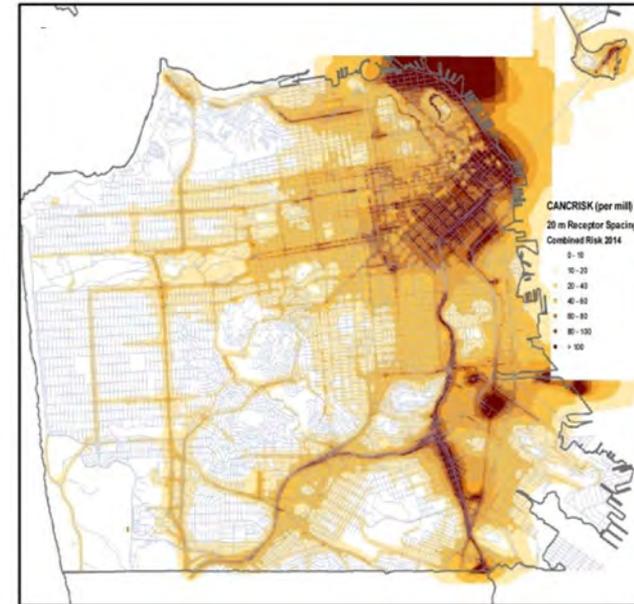
Key Findings and Outcomes

- Air quality in West Oakland is improving due to collaborative efforts by:
 - State in adopting regulations targeting the sources of pollution
 - Air District for enforcing the regulations and offering incentives
 - Port in supporting enforcement efforts
 - Businesses in complying with the regulations
 - Community members for worked with the City of Oakland and the Port, assisting in field studies, and distributing information
 - Researchers in assessing the effectiveness of the mitigations
- Truck support services and parking are planned for the former Oakland Army Base
- No violations were issued by the District in July 2013 when over 1,000 trucks were inspected



Upcoming Projects

- Online screening tools to assess exposure from highways, stationary sources, and rail
- Technical guidance for assessing exposures and mitigation strategies
- Partnerships with cities to produce Community Risk Reduction Plans for city-wide assessments
- Studies of indoor air measurements to quantify effectiveness of filtration systems



More information, visit:

<http://www.baaqmd.gov/Divisions/Planning-and-Research/CARE-Program.aspx>



Continuing Education Credits Available

- 1 credit hour available from APHA in Medicine, Nursing, or Health Education
- Must complete online evaluation
 - Will receive via email within 48 hours
- If not logged in to webinar with your own name, send email to healthypeople@norc.org within **24 hours after webinar**



Healthy People 2020 Stories from the Field

A library of stories highlighting ways organizations across the country are implementing Healthy People 2020

HealthyPeople.gov

Search HealthyPeople.gov

Find us on: [Twitter](#) [LinkedIn](#) [Facebook](#) [YouTube](#) [Get E-mail Updates](#)

Home About Healthy People 2020 Topics & Objectives Data Learn Implement Get Involved Leading Health Indicators

Home > Implement > Healthy People in Action > Sharing Library: Map View

In This Section:

- Evidence-Based Resources
- Healthy People in Action
 - Sharing Library
 - Share Your Story
 - State Plans
- MAP-IT
 - Mobilize
 - Assess
 - Plan
 - Implement
 - Track
- Planning Resources
- Funding Resources
- Tools For Professionals*

Sharing Library: Map View

Find stories highlighting how communities across the country are implementing Healthy People 2020—or [share your own!](#) Stories featured here have been submitted by communities (“Story from the Field”) or developed as part of the Healthy People 2020 *Who’s Leading the Leading Health Indicators?* series. [Learn more about the Leading Health Indicators.](#)

Use the **Map View** to see where stories are taking place across the country. Click on a pin on the map to get more details on the story, including organization name and zip code and Healthy People 2020 Topic Area addressed. Click on the story title to view the full story.

Map View List View

Map Satellite

United States

Healthy People 2020 in Action

- Who’s Leading the Leading Health Indicators? series
- Stories from the Field

Healthy People in Action - Sharing Library

<http://healthypeople.gov/2020/implement/MapSharingLibrary.aspx>



Promoting and Measuring Well-Being and Health-Related Quality of Life: A Healthy People 2020 Spotlight on Health Webinar

- Join us on September 25 2014, from 12:30 pm to 2:00 pm ET
- Free Educational Webinar
- Register to attend at HealthyPeople.gov





Healthy People 2020 Progress Review Webinar

Join us as we review progress on Healthy People 2020 objectives in the **Diabetes** and **Chronic Kidney Disease** topic areas.

September 29 2014

Hear from a community-based organization that is working locally to improve health.

***Register at
www.healthypeople.gov***





Stay Connected

- Visit healthypeople.gov to learn more about the Healthy People 2020 Leading Health Indicators.
- To receive the latest information about Healthy People 2020 and related events, visit our website to:
 - Join the Healthy People 2020 Consortium
 - Share how your organization is working to achieve Healthy People goals



Follow us on Twitter @gohealthypeople



Join our Healthy People 2020 group on LinkedIn