

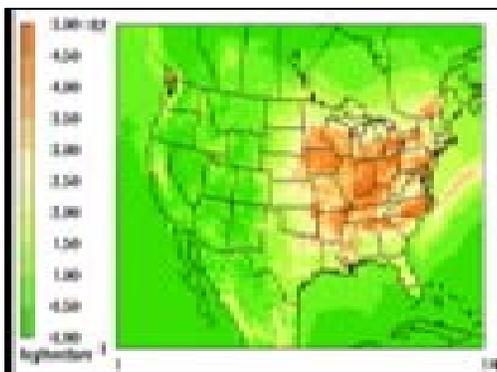


CLEAN AIR RESEARCH PROGRAM

BUILDING A SCIENTIFIC FOUNDATION FOR SOUND ENVIRONMENTAL DECISIONS

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Clean Air Research Program 2010...



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April 30, 2009

HEALTH EFFECTS OF AIR POLLUTION

Respiratory Effects on Individuals

- Smog:** Irritates the eyes, nose, and throat; causes coughing and wheezing; aggravates asthma and other lung diseases; causes bronchitis and emphysema; causes lung cancer.
- Acid Rain:** Irritates the respiratory system; causes coughing and wheezing; aggravates asthma and other lung diseases; causes bronchitis and emphysema; causes lung cancer.
- Global Warming:** Causes heat stress and dehydration; causes heat stroke and heat exhaustion; causes heat-related deaths.

Cardiovascular Effects on Individuals

- Heart Disease:** Causes heart disease and stroke; causes heart failure; causes heart attack.
- Stroke:** Causes stroke.
- Heart Failure:** Causes heart failure.
- Heart Attack:** Causes heart attack.

Other Health Effects

- Eye Irritation:** Causes eye irritation.
- Headaches:** Causes headaches.
- Respiratory Infections:** Causes respiratory infections.
- Reproductive and Developmental Effects:** Causes reproductive and developmental effects.
- Neurological Effects:** Causes neurological effects.
- Immune System Effects:** Causes immune system effects.

SEPA U.S. Environmental Protection Agency
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Pollutant	What is used?	Common Sources
Particulate Matter (PM)	Coal, oil, gas, wood, and other fossil fuels; diesel engines; construction activities; agriculture; natural sources.	Power plants, industrial facilities, vehicles, construction, agriculture, natural sources.
Ozone (O ₃)	Gasoline, solvents, paints, and other volatile organic compounds (VOCs); nitrogen oxides (NO _x).	Gasoline, solvents, paints, industrial facilities, vehicles, power plants.
Carbon Monoxide (CO)	Gasoline, coal, and other fossil fuels.	Gasoline, coal, industrial facilities, vehicles, power plants.

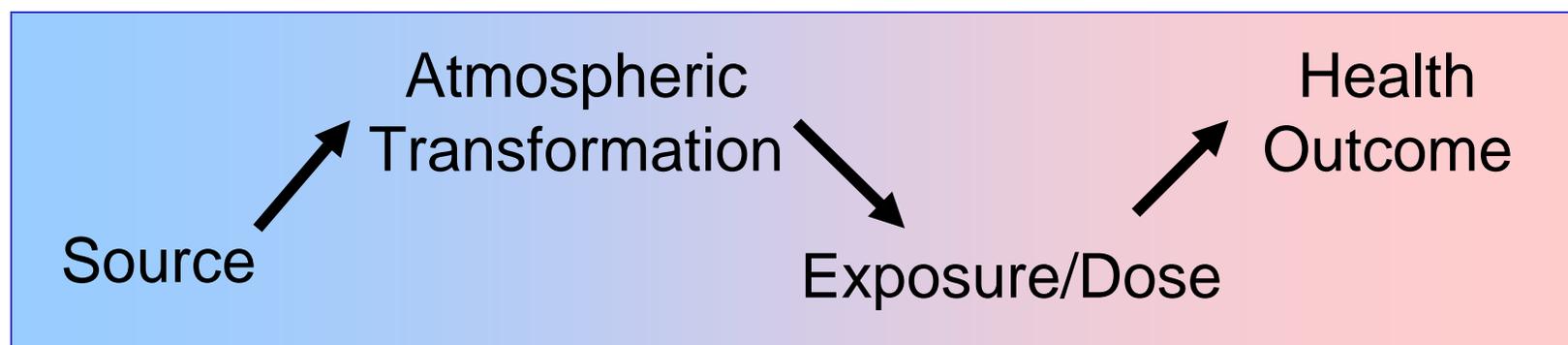


Recent Key Advances and Accomplishments

- **Lung growth** retarded by air pollution
- Health risk impacts of **Eastern > Western PM**
- **Roadway** 'emissions' constitute a significant **MP exposure** burden with linked to multiple health outcomes (esp. re PM)
- **CMAQ** steadily evolves as a MP modeling tool with **finer grid** scales and enhanced **SOA** chemistry to improve client utility
- **Coarse PM** (like fine) alters cardiac function - esp. in susceptibles
- **AQ-health** researchers find common ground to advance PM conc-response risk estimates and dissect the role of components
- **Reduction** in ambient PM from 1980-2000 resulted in nearly half a year of increase in life-expectancy (**accountability**).

Basic themes of the program are unchanged

- Conduct & communicate air pollution science for stakeholder use
 - Address “all NAAQS all the time” and “what about” Air Toxics
- Multipollutant program will evolve from source to health paradigm...
 - Execution of ‘IMD’ near-road campaigns across L/C and partners
 - Promote the concept of ‘accountability’ in Air program areas



- Integration across L / C and science disciplines
- Opportunistic and proactive leveraging (public / private)



Anticipated 2010-2014 Milestones and Challenges

- Maximize the integration of AQ monitoring -health assessments
- Shift Air program emphasis from 60:40 research effort in support of NAAQS/ATs relative to multipollutant research to 40:60 effort
- Complete LV near road campaign; fully establish ‘source to health outcome’ paradigm in Detroit (2009-11); Raleigh (?) - 2012
- Devise MP research strategies to disentangle the impact of single pollutants (in support of NAAQS) and their interactions
- Establish a strategy for integration of “accountability” into fundamental Air research project structure
- Implementation support through improved models, tools and methods (esp. continuous)

Future: Climate & AQ Mgmt – Global CC ↔ Clean Air

