

# Traffic- Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects

---

*HEI 2009 Annual Conference*

May 3-5, 2009

Maria Costantini  
Health Effects Institute



# Rationale

HEI published the book *Air Pollution, the Automobile, and Public Health* in 1988. Since then

- Substantial literature has been published on air pollution from traffic and health effects using advanced exposure models and biostatistical analyses
- Concerns have emerged about human exposures, especially for those living in proximity to highways and major roads



# Goals of the Review

Summarize and synthesize relevant information on air pollution from traffic and its health effects linking

- Information on tailpipe emissions with human exposure
- Human exposure to air pollution from traffic with human health effects (epidemiology)
- Toxicological data with epidemiologic associations



# HEI Traffic Review Panel

Kenneth Demerjian—SUNY, Albany

Mark Frampton—U Rochester

Michael Jerrett—UC Berkeley

Frank Kelly—King's College

Lester Kobzik—Harvard SPH

Nino Künzli—IMdM, Barcelona

Brian Leaderer—Yale SPH

Thomas Lumley—U of Washington SPH

Frederick Lurmann—Sonoma Tech. Inc

Sylvia Richardson—Imperial College

Jon Samet—Johns Hopkins

Ira Tager—UC Berkeley, *Chair*

Michael Walsh—Consultant



# Organization of the Panel

- Emissions and Exposure Characterization
  - **Kenneth Demerjian\*** (chair), Michael Jerrett, Brian Leaderer \*, Fred Lurmann, Mike Walsh
- Epidemiology
  - **Ira Tager (chair)\***, Nino Kunzli, Thomas Lumley, **Sylvia Richardson\***, John Samet
- Toxicology
  - Mark Frampton (chair), Frank Kelly, Lester Kobzik

\*Member of Research or Review Committee



# HEI Staff

- Maria Costantini
- Kelly Pitts
- Barbara Gale
- Hilary Polk
- Others
  - Jane Warren
  - Amara Ezeamama
  - Debra Kaden
  - Davida Schiff



# Time Line

- **February 2007** First Panel meeting (planning)
- Mar-May 2007 Complete literature searches
- June-Dec 2007 Develop draft chapters
- Jan- Feb 2008 Panel review of drafts
- **February 2008** Second Panel meeting
- March-Sept. 2008 Complete chapters and update searches
- **End of Sept. 2008** Final Drafts to Panel
- October 2008 Third Panel meeting
- **Dec. 15, 2008** Outside reviews
- Feb-Mar 2009 Address reviewers' comments,  
light editing
- **May 2009** Pre-Print of final document
- May-Sept 2009 Editorial correction and publication



# Organization of Report

## CHAPTERS

- Introduction
- Emissions from Motor Vehicle
- Exposure to Traffic-Related Air Pollution
- Health Effects: Epidemiology
- Health Effects: Toxicology
- Synthesis of Evidence from Epidemiology and Toxicology
- Conclusions: Summary and Synthesis



# Chapter 2- Emissions

*Premise: Emission data are needed to*

- Describe exposure
  - Trends in transportation emissions in the context of national inventories
    - Effects of control technologies, new fuels, etc
  - Emissions inventories and modeling
  - Physical and chemical transformations near roads
- *Understand the relative importance of traffic emissions to air pollution in total and at specific locations*
  - Contribution to PM, gases, VOC, NO<sub>x</sub>



# Acknowledgments

- HEI would like thank the members of the Panel for their hard works and commitment to the project.
- HEI would like to acknowledge the contribution of the peer-reviewers, whose thoughtful comments have provided the opportunity for clarifying or revising parts of the report

