

Air Quality Data in Health Effects Research

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Policy Issues

- Can scientific evidence provide a basis for moving beyond a PM mass-only standard?
- Can scientific evidence provide a basis for regulating the PM sources most relevant to public health protection?

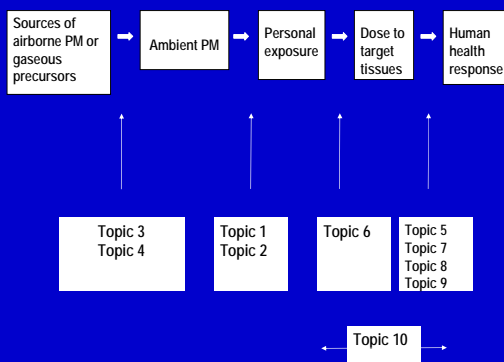
National Research Council's PM Committee



Research Priorities Recommended by the Committee

- Research Topic 1.* Outdoor Measures Versus Actual Human Exposures
Research Topic 2. Exposures of Susceptible Subpopulations to Toxic Particulate Matter Components
Research Topic 3. Characterization of Emission Sources
Research Topic 4. Air Quality Model Development and Testing
Research Topic 5. Assessment of Hazardous Particulate Matter Components
Research Topic 6. Dosimetry; Deposition and Fate of Particles in the Respiratory Tract
Research Topic 7. Combined Effects of Particulate Matter and Gaseous Pollutants
Research Topic 8. Susceptible Subpopulations
Research Topic 9. Mechanisms of Injury
Research Topic 10. Analysis and Measurement

A General Framework for Integrating PM Research



Topic 5: Not Much Progress as of 2004

Topic 5: Modest progress and some new insights on assessing hazardous PM components. However, the matrix of PM composition and health responses has only been partially explored. A more systematic approach is needed for this pivotal topic; it carries implications not only for research directions but also for PM-control strategies.

LOOKING ACROSS THE RESEARCH TOPICS

- **Increasing Number of Adverse Health Outcomes Associated With PM and Related Susceptible Subpopulations**

Research focus on total morbidity and mortality has broadened to more particle-related health outcomes and more susceptible subpopulations.

- **Particle Toxicity In Relation To Different Particle Characteristics and Emission-Source Types**

Information to fill this critical gap is needed to move from strategies directed at particles generally to particular sources of more-toxic particles.

- **Increasing Emphasis on Exposure-Dose-Response Relationships**

Emphasis needs to be shifted from hazard identification to characterizing the form of the quantitative relationship between exposure and risk.

(continued)

LOOKING ACROSS THE RESEARCH TOPICS (continued)

- **Considering PM Health Effects within the Broader Context of Other Pollutants Present in Ambient Air**

Single pollutants may be acting together to increase risk through interactive mechanisms.

- **Designing PM Research Programs to Most Effectively Inform the Setting and Implementing of the PM NAAQS**

PM research results may have significant impacts on setting NAAQS, and characterizing emissions and evaluation of models are needed for planning NAAQS attainment.

CHALLENGES FOR THE YEARS AHEAD

- **Completing PM Emissions Inventory and Air Quality Models Necessary for NAAQS Implementation**

Faster progress is needed to ensure SIPs are based on best information available. Promote iterative improvements in emission inventories, monitoring networks, and air quality models.

- **Developing a Systematic Program to Assess Toxicity of PM Mixture Components**

Reconsider solely investigator-initiated approaches; move toward a more systematic evaluation of PM characteristics and health outcomes combined with investigator initiated research.

- **Enhancing Air Quality Monitoring for Research**

Meeting PM research needs will require a shift from NAAQS compliance toward serving multiple purposes.

(continued)

- **Investigating Health Effects of Long-Term Exposure to Air Pollution**

For quantitative risk assessment and cost-benefit analysis, estimates of disease burden associated with exposure to particles are needed and research should continue to develop on the basis of existing and new cohorts.

- **Improved Toxicological Approaches**

Studies of appropriate design are needed to overcome current limitations; also needed are well-characterized particle samples for experimental exposures.

- **From a Particulate Matter Research Program to a Multipollutant Research Program**

This shift in focus should acknowledge that real-world exposures involve complex mixtures of hundreds of air contaminants of several physical-chemical classes.

- **Integrating Across Disciplines**

Expanding multidisciplinary strategies and programs will be essential to implement a multipollutant approach.

The Central Role of the Speciation Monitoring Network

- Monitoring network in place for PM_{2.5} and components
- Platform for observational studies on PM components and health
- What are the limitations?
- What types of studies will it support?
- What can we learn?

Introduction: Goals of the meeting (A multidisciplinary problem)

- To bring together epidemiologists, exposure assessors, atmospheric scientists and other relevant researchers to discuss potential problems in using the available PM components data in epidemiologic research.

**Introduction: Goals of the meeting
(What data are available?)**

- To understand what PM_{2.5} components – and other PM characteristics - data are currently available, the limitations of the existing data, and what pollutant data will be available in the future.

**Introduction: Goals of the meeting
(How can exposure be classified)**

- To understand how existing air pollutant data and other information are being used to develop classifications of exposure to PM characteristics.

**Introduction: Goals of the meeting
(What types of studies and health outcomes?)**

- To determine how air pollutant data and other information are being linked to health outcomes in different types of health outcome studies.

**Introduction: Goals of the meeting
(How to best use the data?)**

- To recommend common data handling approaches that would be helpful to improve comparability of exposure classification in epidemiology studies, and to establish an approach for cataloguing problems that arise in use of the data.

Needs Moving Forward

- Coordination among researchers
- Documentation of approaches and problems
- Refinements to the network
- Communication of research needs

Potential Outputs of the Meeting

- Enhance understanding of the data by users
- Establish a forum for communications
- Identify potential “problems”
- Feedback to EPA

Remember: My data—right or wrong!