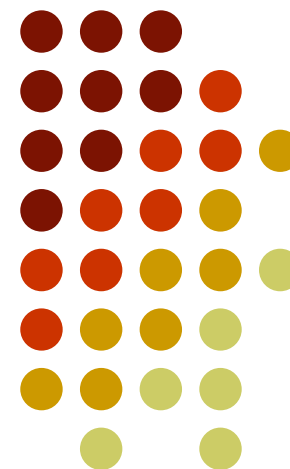


US EPA ARCHIVE DOCUMENT

Research Needs

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Research Needs



I will focus on two research needs:

- Assessment of human exposures to PM components and;
- Identification of PM toxic components



Outdoor Measures Versus Actual Human Exposures

- High correlations for fine mass and sulfates
- Weak correlations for coarse and ultrafine particles and black carbon
- Human exposures/outdoor concentration relationships depend on home ventilation rates and vary by city and season

Continue Research on PM Exposure Assessment



- Assess human exposures to fine, coarse and ultrafine particles and their components as they relate exposures to specific sources
- Focus on susceptible subpopulations
- Investigate differences among cities



Identify Toxic Components/ Sources

- Conventional Epidemiological Studies -- Challenges
 - Particles are internal mixtures
 - Components are correlated
 - Co-pollutants are present
 - Sources are spatially mixed
 - More than one silver bullet may exist



Accomplishments

- A large spectrum of cardiopulmonary and respiratory outcomes have been associated with particle exposures
- A number of susceptible subpopulations have been identified
- Toxicological and exposure assessment studies have been very useful in our efforts to validate epidemiological studies

Use Available Biological, Exposure and Statistical of Tools



- Conduct studies that address specific hypothesis regarding different sources/ components by creating the appropriate exposure scenarios



Population Studies

- Multiple Cities
 - Particle toxicity versus composition (e.g. LA vs NY)
 - Exposures and climatic differences (e.g. home ventilation, penetration of sulfate vs nitrate)
- Single City
 - Toxicity of specific sources (e.g. individuals living at different distances from roads)
 - Particles and gaseous co-pollutant concentrations may be correlated

Panel Studies



- Patrolmen study (highway exposures)
- Bus study (city traffic exposures)

Controlled Exposures



- Source particles (e.g. diesel, wood burning, secondary particles of a specific source)
- Concentrated ambient particles (e.g. fine vs coarse vs ultrafine)