Coarse Particulate Matter: A Policy Perspective

Presentation for the Final Progress Review: Sources, Composition, and Health Effects of Coarse Particulate Matter

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Coarse PM: A Brief History of EPA Policy

- 1987: EPA first set PM_{10} standards in order to protect against exposures to particles that can penetrate deeply into the respiratory system
  - 24-hour standard: Level set at 150 $\mu g/m^3$
  - Annual standard: Level set at 50 $\mu g/m^3$
- 1997: Given newly established fine particle standards, purpose of PM_{10} standards became to protect against the coarse fraction of PM_{10} (i.e., $PM_{10-2.5}$)
- 2006: EPA retained the 24-hour standard and revoked the annual standard
  - Decision on annual standard based on insufficient evidence linking health problems to long-term exposure to inhalable coarse particle pollution
  - In subsequent litigation, DC Circuit court upheld decisions and supporting rationale for PM_{10} standard
- 2012: Today's 24-hour PM_{10} standard is the same as that set in 1987, and has had the same purpose since 1997 (i.e., to protect against $PM_{10-2.5}$)

Coarse PM: EPA Conclusions on the Science in the 2012 Review

- EPA's characterization of the available evidence was based on ORD's PM Integrated Science Assessment (ISA)
  - PM ISA underwent multiple rounds of CASAC and public review and discussion at public meetings
- ISA Conclusions
  - The available evidence was judged to be "suggestive" of a causal relationship between short-term $PM_{10-2.5}$ exposures and mortality, respiratory effects, and cardiovascular effects
    - "Suggestive," rather than "causal" or "likely causal", reflects the greater degree of uncertainty associated with the health evidence for $PM_{10-2.5}$
  - Evidence not sufficient to link health effects with specific sources or components of $PM_{10-2.5}$
- Administrator's conclusion in final rule: Important uncertainties and limitations in the evidence raise questions as to whether public health benefits would be achieved by revising the existing PM_{10} standard

Coarse PM: Scientific Uncertainties Noted in the 2012 Review

- Extent to which $PM_{10-2.5}$, rather than one or more co-occurring pollutants, is responsible for health effects reported in epidemiologic studies
  - Relatively small number of studies that have evaluated co-pollutant models and small number of supporting experimental studies
- Extent to which $PM_{10-2.5}$ concentrations measured at central-site monitors reflect exposures in study populations
  - Relatively limited spatial coverage provided by existing $PM_{10-2.5}$ monitors combined with the relatively large spatial variability in ambient $PM_{10-2.5}$ concentrations
- $PM_{10-2.5}$ concentrations at which reported health effects occur
  - Given the lack of a national monitoring network for $PM_{10-2.5}$, different health studies have used different approaches to estimate or measure $PM_{10-2.5}$ and it is not clear how these different methods relate to each other
  - Increases uncertainty in estimates of the extent to which changes in ambient $PM_{10-2.5}$ concentrations would likely impact public health
- Extent to which $PM_{10-2.5}$ composition affects particle toxicity
  - Lack of information on $PM_{10-2.5}$ composition makes it difficult to characterize the variability in health effect associations

Issues Likely to be Important in Next Review

- Overall strength of the scientific evidence for health effects attributable to coarse PM mass and/or components
  - Will consider epidemiologic, controlled human exposure, animal/in vitro toxicology
- Extent to which new evidence addresses important uncertainties identified in 2012 review, including…
  - Potential for co-pollutant confounding
  - Exposure error
  - $PM_{10-2.5}$ concentrations at which reported health effects occur
  - Extent to which $PM_{10-2.5}$ composition affects particle toxicity