



Risk Assessment to Support the Review of the PM NAAQS – Second External Review Draft

Clean Air Scientific Advisory Committee Review Meeting



Office of Air Quality Planning
and Standards

U.S. EPA

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Enhancements and Modifications for the 2nd Draft RA

- New integrated discussion (Chapter 6)
- Expanded discussion of rationale for:
 - Excluding PM_{10-2.5} from quantitative risk assessment
 - Design elements in the core analysis (selection of epidemiology studies and specification of C-R functions)
 - Approach for qualitatively assessing variability and uncertainty
- Expand sensitivity analysis:
 - Consider impact of different lags in modeling short-term morbidity endpoints
 - Compare results of the sensitivity analysis with the magnitude of uncertainty in statistical fit of the effect estimates



Enhancements and Modifications for the 2nd Draft RA (contd.)

- Inclusion of peak shaving rollback method (to represent more localized patterns of reductions in ambient PM_{2.5} levels)
- Use of composite monitor PM_{2.5} levels as a surrogate for long-term exposure-related mortality in assessing impact of different rollback methods
- Expanded use of results of the sensitivity analysis (as an additional set of reasonable risk estimates) to inform consideration of uncertainty in core risk estimates
- Considered interplay of annual and 24-hour design values together with patterns in PM_{2.5} monitoring data in helping to interpret patterns of risk reduction for study areas



Requested CASAC Feedback - Chapter 3 (Urban Case Study Analysis Methods)

- Air quality inputs – inclusion of peak shaving rollback method (along with proportional and hybrid)
 - Use of composite monitor annual-average $PM_{2.5}$ levels as surrogate for long-term exposure-related mortality

- Selection of model inputs for the core analysis- expanded discussion of our rationale
 - Particularly for selection of epidemiology studies and specification of C-R functions

- Addressing uncertainty and variability
 - Clarified process for qualitatively assessing sources of variability
 - Added coverage for specific sources of variability in our sensitivity analysis
 - Expanded discussion of qualitative analysis of uncertainty
 - Considered pair-wise interactions of sources of uncertainty



Requested CASAC Feedback - Chapter 4 (Urban Case Study Results)

- Sensitivity analysis – use of results as an additional set of risk estimates to inform consideration of uncertainty

- Consideration of design values and patterns of PM_{2.5} monitoring data across study areas in interpreting risk estimates



Requested CASAC Feedback - Chapter 6 (Integrated Discussion)

- Captures key policy-relevant questions in integrating results of the various analyses
- Consideration of range of factors in interpreting core risk estimates
 - Interplay of annual and 24-hour design values
 - Peakiness of PM_{2.5} distributions within study areas
 - Application of different rollback approaches (and impacts on degree of risk reduction)
- Assessment of confidence associated with core risk estimates – based on:
 - Sensitivity analysis results
 - Consideration for qualitative analysis of uncertainty and variability
- Results of several national-scale analyses used to place risk estimates in broader national-context
 - National-scale PM_{2.5} mortality analysis
 - Representativeness analysis
 - (new) exploration of design values and patterns in PM_{2.5} monitoring data



Requested CASAC Feedback - Chapter 6 (Integrated Discussion) (contd.)

■ Key observations:

- Alternative annual standard levels provide more consistent level of public health protection and have higher overall confidence relative to alternative 24-hour standard levels
- Potential utility in estimating risk for alternative annual standard levels below $12 \mu\text{g}/\text{m}^3$



SUPPLEMENTAL INFO: Additional Preliminary Analysis: Alternative Annual Standard Level of 10 µg/m3

- Completed preliminary estimates of long-term exposure-related mortality risk for: 10/35 and 10/25

Comparison of risk for 12/35 against 12/25 and 10/35 (percent of long-term exposure-related IHD mortality attributable to PM_{2.5} - reflects proportional rollback)

Risk Assessment Location	Percent reduction compared with 12/35		Annual average PM _{2.5} (for 12/25)
	For 12/25	For 10/35	
Dallas, TX	0%	34%	12
Houston, TX	0%	37%	12
Atlanta, GA	3%	32%	11.8
Birmingham, AL	18%	36%	11.1
St. Louis, MO	22%	36%	10.8
Baltimore, MD	23%	36%	10.7
Detroit, MI	35%	39%	10.2
Philadelphia, PA	35%	35%	10
Phoenix, AZ	43%	42%	9.9
New York, NY	43%	36%	9.7
Pittsburgh, PA	42%	35%	9.7
Los Angeles, CA	63%	45%	9.2
Fresno, CA	64%	0%	7.3
Tacoma, WA	94%	0%	6.3
Salt Lake City, UT	100%	0%	5.7