

## **Additional Analyses under Consideration by EPA for Inclusion in the Second Draft Ozone Health Risk and Exposure Assessment**

### **Chapter 2 – Conceptual Framework**

1. Addition of conceptual framework diagram and additional text laying out conceptual framework in more clear terms, e.g. major steps in analysis, key inputs, analytical outcomes, risk characterization.

### **Chapter 4 – Air Quality Considerations**

1. Continued evaluation of CMAQ-HDDM methodology for adjusting ozone air quality distributions to simulate just meeting the current and alternative standards. Conditional on positive evaluation, considering implementing CMAQ-HDDM adjustments for the 2<sup>nd</sup> draft REA, including the following updates to the CMAQ-HDDM model:
  - a. Update to the 2007 modeling platform
  - b. Include a longer modeling period (we have not determined if we will model the whole year or just May-Sep, Apr-Oct . . . this will depend on what is feasible time-wise and what is deemed necessary)
  - c. Update to CMAQv5.0 if it is available (HDDM is not yet available in CMAQv5.0 and there is no guarantee that it will be ready in time but if it is we'd like to use it)
  - d. If time permits, explore other approaches for grouping modeled and observed days into bins and calculating average sensitivities.
  - e. Expand to 16 cities (from the 2 cities evaluated in the Simon et al memo)
  - f. Considering expanding to two DV periods (we only analyzed 2006-2008 for the memo but we plan to add 2008-2010 for the 2nd draft)
  - g. Evaluating possibility of using combinations of NO<sub>x</sub>/VOC reductions.

An additional item we are now considering:

2. Evaluation of feasibility of estimating background ozone both using the CMAQ-HDDM model configuration and other available models, as well as considering multiple estimates of background based on alternative definitions

### **Chapter 5 and Chapter 6**

1. Addition of 12 additional urban areas for a total of 16 urban areas
2. Addition of exposure estimates for outdoor workers and people > 65 years old
3. Addition of exposures estimated for air quality just meeting alternative standards and change in exposure between scenarios just meeting current and alternative standards.

### **Chapter 5 (Exposure Assessment)**

1. Improvement in the depth and clarity of documentation, presentation of results, and discussion of results; present distributions of exposures
2. Addition of discussion of representativeness of the 16 urban areas for exposure assessment
3. Addition of sensitivity analyses (effects on exposure distributions and lung function risk):
  - a. Considering evaluation of exposures above background concentrations
  - b. Considering evaluation of representativeness of CHAD activity patterns (geographic location, SES factors, occupation, changes over time for adults and for children, high/medium/low ozone days, and other factors to be determined)
  - c. Considering developing a method for spatial interpolation of ambient ozone concentrations
  - d. Considering evaluation of exertion levels associated with activities (especially outdoor activities)
4. Analysis of repeated exposures for cohorts of school children (i) during the school year, (ii) during the summer (vacation)
5. Additional clarification of types of uncertainty characterization (qualitative, sensitivity analyses, influence assessment, etc.)

#### **Chapter 6 – Lung Function Risk Assessment**

1. Conditional on availability of data from study authors, update the two lung function risk models with data from additional clinical studies (including Kim et al. (2011) and Schelegle et al. (2009)).
2. Conditional on availability of data from study authors, and inclusion in the final ISA, evaluate the potential for using the McDonnell et al. (2012) model in estimating lung function decrements. To implement the model in APEX, EPA needs the data used to fit the model to evaluate the uncertainty of the model.

#### **Chapter 7 – Urban Area Case Studies**

1. Addition of assessment of risks remaining after just meeting alternative standards and incremental risk reductions for alternative standards
2. Addition of assessment of respiratory mortality risks from long term ozone exposures - including potential sensitivity analysis based on modeling risk using regional effect estimates
3. Addition of confidence intervals for estimates of risk reductions between recent conditions and just meeting current standards and between current standards and alternative standards
4. Conditional on availability of data from study authors, consideration of adding sensitivity analyses for alternative model specifications (e.g., lag, co-pollutant, regional vs national priors) for short-term exposure-related mortality and morbidity

5. Consideration of analysis of composite monitor constructs, e.g. MSA averages, used in source epidemiological studies to determine if we should more closely match those structures in our risk modeling
6. Addition of further analysis of patterns of interest in risk assessment in order to provide better evaluation of results (e.g., explanation of substantially larger effect estimates for short-term exposure related mortality in some cities)
7. Conditional on availability of data from study authors, use of actual LML values from epidemiological studies (alternatively, if those data are not available, we are considering constructing LML values based on AQS data for the time periods matching those used in the studies)
8. Consideration of sensitivity analysis using interpolation of missing ozone data in deriving composite monitor values (similar to exposure analysis approach)

#### **Chapter 8 – National Scale Recent Conditions Risk Analysis**

1. Addition of estimates of long-term exposure respiratory mortality
2. Correction of error in May-September average 8-hr daily maximum concentrations
3. Application of May-September city-specific concentration-response factors from Bell et al. (2004) if available
4. Conditional on availability of NMMAPS LML values from study authors, application of those LML values to Bell et al. (2004) mortality estimates
5. Conditional on availability of data from study authors, consideration of using city-specific LMLs for cities included in NMMAPS

#### **Chapter 8 – Assessment of Representativeness of Urban Case Study Areas**

1. Consideration of using American Time Use Survey (ATUS) data to compare national representativeness of selected urban areas for time spent outdoors