

Extending PM Risk Analyses to Address Scientific Uncertainties

Anne E. Smith, W. Paul Labys

Charles River Associates

January 3, 2003

In this presentation, we will briefly review the basic formula used by EPA in its PM_{2.5} health risk analyses. We will then explain how the formula can be adapted to address several of the critical scientific uncertainties that exist regarding the nature of PM_{2.5} health effects, while retaining consistency with the epidemiological findings that inform the risk analysis.

Uncertainties that we address include:

- (1) acute versus chronic risks,
- (2) nonlinearities (“thresholds”) in the risk relationship,
- (3) different relative toxicities of individual PM constituents,
- (4) policy implementation strategies (“rollback methods”).

Using detailed daily ambient PM_{2.5} constituent data from the Atlanta SEARCH project as the basis for a Monte Carlo simulation, we will demonstrate the sensitivity of the risk estimates to these uncertainties. Our examples show how these scientific uncertainties interact with each other, producing a greater range of uncertainty when considered in combination than when considered individually.