

## **SOCAAR Seminar**

**March 6, 2013, 3 - 4 pm  
Wallberg Building  
200 College Street, Room 407**

### **Uncertainty and Variability in Social Costs for Air Quality**

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Choosing between alternative products, processes and policies requires credible information on the private costs and the social costs, specifically human health and ecosystem effects. To generate a social cost of air quality in \$/ton of emission, an impact pathway approach, which traces the emissions through to the monetization of the associated human health effects, is frequently employed. An important step in this process is transforming the emissions to their equivalent ambient concentrations. The assumptions in the air quality models, however, are rarely evaluated and may introduce unknown error into literature values.

In this presentation, we evaluate the sources of variability and uncertainty in the social cost estimates for air quality with the goal of providing guidance on the selection and interpretation of literature values. First, we conduct a critical review of the reduced form values in literature. Second, we develop new social cost estimates using the 'state of science' 3-D chemical transport model, the Particulate Matter Comprehensive Air Quality Model with extensions (PMCAMx). Specifically, we translate emissions of elemental

carbon, nitrogen oxides, sulphur dioxide, and volatile organic compounds in fine particulate matter (PM<sub>2.5</sub>) in different locations and using different model parameterizations. We then monetize the PM<sub>2.5</sub> using the long-term premature mortality concentration response function and the value of a statistical life. We calculate social costs that differ from other literature values by a factor of two to more than ten for both reactive and non-reactive compounds. This suggests that variability in the modeled transport and chemistry can have an important influence on the estimates. Our results recommend caution in the use of literature values for the social cost of air quality emissions for benefit-cost analysis and externality pricing.

This seminar will be recorded and will be available after the talk at the following site:

[http://www.socaaar.utoronto.ca/collaboration/SOCAAR\\_Seminar\\_Series.htm](http://www.socaaar.utoronto.ca/collaboration/SOCAAR_Seminar_Series.htm)

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