

## Society For Risk Analysis Annual Meeting 2010

### *Risk Analysis in Action*

M3-E: Monday, December 6, 2010

Symposium: Reconstruction of Exposure & Dose

**M3-E.2 13:50 The role of exposure reconstruction in occupational human health risk assessment: Current methods and a recommended framework.** *Sahmel J\**, *Devlin K*, *Paustenbach DJ*, *Hollins D*, *Gaffney SH*; *ChemRisk, Inc.* [jsahmel@chemrisk.com](mailto:jsahmel@chemrisk.com)

**Abstract:** Exposure reconstruction for substances of interest to human health is a process that has been used, with varying levels of sophistication, for several decades. The importance of robust and high-quality exposure reconstruction has been widely recognized. It has also been noted that misclassification of reconstructed exposures is relatively common and can result in potentially significant effects on the conclusions of a human health risk assessment or epidemiology study. In this analysis, a review of the key occupational exposure reconstruction approaches described in over 400 papers in the peer-reviewed literature will be presented. These approaches have been critically evaluated and classified according to quantitative, semi-quantitative, and qualitative approaches. The approach selected for a particular reconstruction effort should be incorporated into a systematic framework for conducting exposure reconstructions. Our analysis indicates that much can still be done to improve the overall quality and consistency of exposure reconstructions and that such a framework will help to standardize the process in the future. The seven recommended steps in the exposure reconstruction process include identifying the goals of the reconstruction, organizing and ranking the available data, identifying key data gaps, selecting the best information sources and methodology for the reconstruction, incorporating probabilistic methods into the reconstruction, conducting an uncertainty analysis, and validating the results of the reconstruction. Influential emerging techniques, such as Bayesian data analysis and combination/comparative methods, will be highlighted. Important issues that will likely influence the conduct of exposure reconstruction into the future include improving statistical analysis methods, addressing the issue of chemical mixtures, evaluating aggregate exposures, and ensuring transparency with respect to variability and uncertainty in the reconstruction effort.