

New Methods for Evaluation of Exposure Data Measured as Mixtures

Enrique F. Schisterman. *Epidemiology Branch (EB), Division of Epidemiology, Statistics & Prevention Research (DESPR), National Institute of Child Health & Human Development (NICHD).*

Humans are exposed to a mixture of chemicals that may be synthetic or occur naturally. However, most research focuses only on a parent compound, its metabolite, or a class of compounds, which lends uncertainty to the modeling of chemical mixtures. This study provided an opportunity to collaborate with five esteemed methodologically-oriented epidemiologists, statisticians, and content experts on an important and time-sensitive research issue pertaining to the assessment of mixtures (of other biomarkers or agents) as potential reproductive and/or developmental toxicants.

We are developing methodologies for estimating health risks associated with mixtures of biological agents. A possible application of this research on mixtures is for biomarkers of oxidative stress (e.g., different vitamins and enzymatic antioxidants). Oxidative stress is a mechanism of action for the effects of many chemicals, and understanding this mechanism is becoming increasingly crucial to health risk assessment of chemicals. We are using data from the recently completed BioCycle Study. Scientific manuscripts have been written and submitted for peer review for publication in a special issue of the journal *Epidemiology*. These papers are expected to document the epidemiological and statistical issues, offer statistical approaches for obtaining valid parameter estimates along with confidence intervals, and empirically demonstrate the utility of the proposed methodology.

Implications: New methodology produced as a result of this collaborative effort will enable researchers to reduce or eliminate bias due to exposure data measured from mixtures. Employing these innovative analysis techniques for such data will enable improved decision making by researchers and policy-makers alike.

Start and end date: December 2006 – December 2008

Presentation(s): None to date.

Peer-reviewed publication(s): None to date.

Other publication(s): None to date.

Sponsors in addition to the LRI: Intramural Research Program, *Eunice Kennedy Shriver* National Institute of Child Health and Human Development.

Abstract revision date: March 2009