

# Mixtures Analysis with Weighted Quantile Sum (WQS) Regression and its Extensions

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**Background:** Biomonitoring studies clearly demonstrate that humans are exposed to complex patterns of environmental chemicals – some of which may act through related pathways (e.g., the endocrine system), thereby increasing the likelihood of a “mixture effect” from multiple chemicals. Statistical methods and study designs for analyzing the complex, often high-dimensional data that arise in environmental health research are relatively new and require knowledge of advanced statistical techniques.

**Content:** Weighted Quantile Sum (WQS) Regression has been extensively applied in environmental health studies to assess both the mixture effect and the driving factors, “bad actors”, in mixtures. An advantage of WQS regression is the simplicity of interpretation of the empirically constructed weighted index of environmental components. In recent years, more sophisticated versions of WQS have been developed to accommodate different study designs (cross-sectional and longitudinal), outcomes (binary, categorical and continuous) and dimension of environmental mixtures (low and high number of chemicals). This workshop will offer an overview of recent methodological advancements, with a specific focus on their applications in international (US, Mexican and Italian) studies, using R ([www.r-project.org](http://www.r-project.org)).

**Significance:** The workshop brings together experts in the fields of environmental health and epidemiology, with experience in developing statistical approaches to assess the human health effects of chemical mixtures. Speakers will include new and experienced researchers working on a diversity of environmental chemical exposures (i.e. phthalates, metabolomics, and metals). The workshop will consist of a short introduction, four applied talks with hands-on sessions in R, followed by a lengthy Q&A session during which the speakers will answer questions on the use of environmental chemical mixtures in both real and synthetic scenarios.

## **Interest for the workshop**

This half-day workshop aims to facilitate:

- development and application of mixture analysis in the environmental health context (using R);
- collaborations and interdisciplinary translational science that can be leveraged to inform policy in global and local communities

## **Maximum number of attendees**

70

## **Duration workshop**

Half day