Day 1 Breakout Session: Exposure Science

Chairperson: Antonia Calafat, PhD

CDC

Underlying Scientific Knowledge Gaps

- Top-down versus bottom-up
  - Top = outcome; Bottom = chemical
- Temporal/spatial variability
  - Exposure as a function life stage
  - Historic versus chronic versus acute
- Non chemical stressors
  - Lifestyle: diet, circadian disruption, etc.

Underlying Scientific Knowledge Gaps (continued)

- Prioritize what is studied based on exposure
  - Variability, prevalence (qualitative), dose
- Biological/individual diversity
  - Life stage
  - Disease state
  - Genetics
  - Voluntary/pharmacological exposures
- Behavior and sources as exposure determinants

Types of Scientific Data Required

- Components in mixtures people are exposed to
  - Qualitative identification of chemicals
  - Point-of-care analytical tools
- How people interact with mixtures
- How the above translate into disease
- Demographics
  - Sex, age, susceptibility, etc.

Issues Encountered in Performing Risk Assessment of Mixtures [NEEDS]

- Need for informatics approach
  - Patterns of exposure
  - "Behaviome"
  - Database, ontologies, standards [QA/QC]
  - Data maintenance – sustainability
    - Public/private partnerships
  - Relational approach
    - Account for individual variability
  - Validation versus development of approaches

Issues Encountered in Performing Risk Assessment of Mixtures [NEEDS]

- Biomarker panels
  - Endogenous versus exogenous responses
- Screening approaches
  - Source/media and exposure pathways – forensics
    - Signature chemical (e.g. formaldehyde)
  - Chemical and biological activity
- Communication between disciplines
  - Translation to public health

Technologies and Innovative Approaches

- Multivariate approach
- Agnostic approach
  - Discovery-driven
- Sharing of epidemiology data sets
- Public/private data maintenance partnership

Bioinformatics is a must!

Last thoughts

- Foster interactive dialog and collaboration among all disciplines
- Integrative measures/approaches
- Take advantage of technological progress

Discussants

Scott Auerbach

David Balshaw

Dana Boyd Barr

Herb Buxton

Antonia Calafat (chairperson)

Brian Curwin

June Dunnick

Richard Kwok

David Lawrence

Joanna Matheson

Minerva Mercado-Feliciano (rapporteur)

Sri Naddadur

Chirag Patel

Paul Price

James Rusling

Rogelio Tornero-Velez