

Day 1 Breakout Session: Epidemiology

Chairperson: Beth Whelan, PhD

NIOSH

Knowledge Gaps

- Proper exposure assessment/measurement
 - Knowledge of chemical co-occurrence
 - Windows of susceptibility
 - Vulnerable populations
 - Misclassification
 - Product information (i.e. what's in product X?)
 - Validated questionnaire data

Knowledge Gaps (continued)

- Translation between toxicology and epidemiology (poor bridge)
 - Mechanisms, exposure groupings
 - Animal versus human doses
- How do you prioritize mixtures?
 - “Lamp post” versus biologically-relevant mixtures
- If we don't know dose-response with single chemicals, what would additivity look like

Knowledge Gaps (continued)

- Number of exposures overwhelming
 - Need to be related via mechanism, potency, structural groups, outcome
 - Can we just sum exposures?
 - Often this information does not exist (e.g. PFCs)
 - What's the approach?
 - E.g. high throughput, binding assays

Conceptual Issues

- What is the goal of the research?
 - Mechanistic, policy, etiologic
- Scientific versus opportunistic (funding)
- Unmeasured contaminants and changing formulations (PBDEs)

Conceptual Issues (continued)

- Multiple comparisons
- Epidemiology can be confounded and/or biased; less likely in experimental designs, and needs to be considered

Types of Scientific Data Required

- Large scale surveys to identify contaminant-contaminant associations
- Toxicology data on choosing chemical groupings
- Better data on disease mechanisms (to help select mixtures)
- Database on endpoint-specific potency factors

Types of Scientific Data Required (continued)

- Validation of intermediate endpoints for disease risk
 - Exposure AND outcome
 - Because of power, high throughput screen concordance
 - Both biomarkers and functional assays

Technologies and Innovative Approaches

- Intermediate assays (like estrogen receptor)
- EWAS
 - Problems with timing of exposure, persistence of toxicant
 - Probably not feasible at this time
- Pooling, multicenter projects, harmonization of testing

Technologies and Innovative Approaches (continued)

- Validating exposures
- Opportunities with mobile devices
- Exposure assessment that reduces participant burden

Last thoughts

- Communication and collaboration between epidemiologists and toxicologists
- Epidemiology dependent on basic science

Discussants

Rosemary Castorina

David Christiani

Julie Daniels

Lyndsey Darrow

Caroline Dilworth

Kimberly Gray

Russ Hauser

Irva Hertz-Piccioto

Todd Jusko (rapporteur)

Kembra Howdeshel

Freya Kamel

Susan Korrick

Andreas Kortenkamp

Scott Masten

Paige Tolbert

Tom Webster

Beth Whelan (chairperson)