

Integration of National Children's Study Hypotheses with Proposed Exposure Measures

Technology-Environmental Measures Group for the National Children's Study

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Background

The Technology-Environmental Measures "Group" composed of federal scientists, with support from National Children's Study contractors, was assembled to identify/propose sampling approaches, measurement methods, and laboratory analytical methods that could be used in the National Children's Study.

Approach

The Group focused on assessing environmental exposures to selected agents in water, soil, dust, and air. In addition, where exposures could be assessed through collection of biological samples, these sampling approaches were then factored into the overall evaluation process.



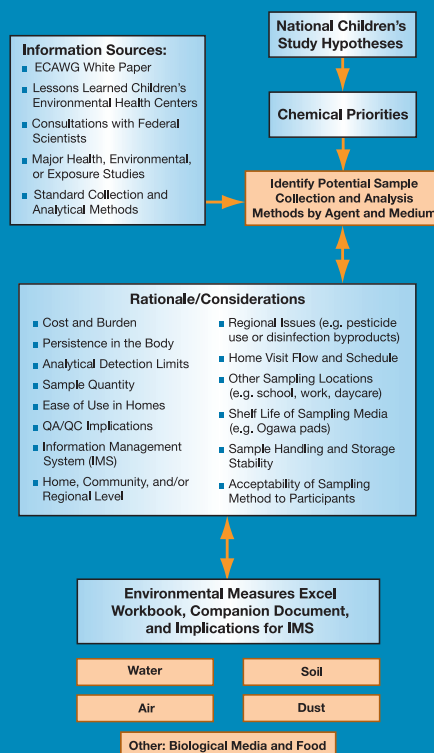
Inputs

- The current National Children's Study hypotheses were used to identify priority agents/chemicals that were primary exposures, potential confounders, and effect modifiers; and to link these to specific outcomes of interest to the Study.
- The Exposure to Chemical Agents Working Group's (ECAWG) White Paper, other Study papers, and work group reports were used as a basis to identify a wide range of possible methods and approaches for assessing exposures.
- Other federal scientists were consulted for advice on specific methods and approaches (non-federal sources were not consulted during this phase due to contract activities for the Study).
- Approaches for measuring environmental contaminants used in other major field studies were considered.

Rationale/Considerations for Selection of Methods/Approaches

- Selection of agents based on Study hypotheses and the national scope of the National Children's Study
- Multi-analyte methods provide data on additional analytes
- Use of mature technology (maintain flexibility to change)
- Combinations of environmental and biological measures
- Linking measurements at different geographic scales (regional, community, household, and person-level)
- Obtain adequate measurement method sensitivity
- Adopt accepted approaches from similar large-scale studies or adopting established methods
- Consider sampling and analytical cost and participant burden
- Sample storage stability and potential for future evaluation as technology evolves

Technology-Environmental Measures Group Evaluation Process



Chemical Priorities

- The National Children's Study hypotheses were used to support the potential inclusion of various chemical compounds/agents.
- Classes of chemical compounds/agents were assessed with regard to potential measurement in environmental and biological sampling media.
- The persistence of the chemical in the body and the time pattern of exposure (e.g., continuous vs. intermittent) was used to guide the decision regarding whether that chemical would be measured in a biological and/or environmental media.



Excel Workbook Contents

- Identifies collection methods, including equipment needs, consumable supplies, and cost
- Identifies analytical methods, analytes, and cost
- Environmental measurements in water
 - Volatile organic compounds (VOCs)
 - Pesticides in water (in agricultural areas)
 - Metals
 - Perchlorate
 - Pathogens
 - Disinfection by-products
- Environmental measurements in soil
 - Metals and pesticides
- Environmental measurements in dust
 - Allergens, mold/fungi, metals, pesticides
- Environmental measurements in air
 - PM_{2.5} with Metals; PM₁₀ with pesticides and PAHs, Mercury, VOCs, aldehydes/ketones, gaseous air pollutants



Companion Document

- Document process and approach
- Provides links to background information and detail
- Documents background, rationale, chemical priorities
- Lists proposed environmental measurements by medium

Implications for National Children's Study

- Helps identify types of laboratories needed to perform analytical methods
- Helps identify logistical considerations for handling samples
- Helps identify shipping and repository requirements
- Provide input to cost forecasting and planning

