A Regional Perspective on Developing Children’s Environmental Health Indicators: The North American Experience

Workshop on Environmental Threats to the Health of Children in the Americas

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Overview

- The need for children’s environmental health information
- Global interest
- North American efforts
  - North American Council on Environmental Cooperation (CEC)
  - The U.S. – “America’s Children and the Environment”
- Issues and Lessons
Children’s Environment and Health Information Needed

- Children are different than adults
  - Exposure: May experience different exposures than adults
  - Health outcome: May experience an outcome to a given exposure that is different from what an adult would experience given the same exposure

- Environment AND health information not available widely
  - Separate health, environment, and other data sets
  - Difficult to see trends, links/associations/relationships, measure progress, or make decisions
  - Particularly difficult for subpopulations -- children
Children’s Environment and Health Information Needed

- Information needed in all areas
  - Descriptive information
    - How many? How much? Where? When?
  - Analytical information
    - Causal links or associations
  - Performance information
    - Measuring, tracking, and evaluating
  - Actionable information
    - Policy-makers, parents, and other care providers
Global Interest

- World Health Organization-Europe
  - Partners: EEA, EC, OECD, and others
  - Well into implementation phase

- North America
  - Canada, Mexico, and the U.S.
  - Well into implementation phase

- World Health Organization
  - Follow up to World Summit on Sustainable Development
  - Common conceptual framework
  - Starting regional pilots
WHO Conceptual Framework

- Multiple Effects Multiple Exposures (MEME)
  - Primary focus on exposures and health outcomes, most relevant for children
- WHO-Europe, CEC, and the U.S. follow the framework
  - Different implementation strategies
Implementation Approaches

- “Uniform” approach – develop uniform core set of issues and indicators with structured data requirements
  - Appropriate where strict comparisons required
  - May be difficult to implement rapidly due to strict data requirements

- “Flexible” approach – identify priority issues and use available data
  - Best suited for preliminary scoping and rapid priority setting
  - May be difficult to compare areas or priorities due to data availability and quality issues
North American Council on Environmental Cooperation

- **Flexible focus**
  - Priority issues and available data (“get started”)
  - Continuing improvement towards “uniform” approach
  - National differences

- **Focuses on exposure and effects**
  - Similar to the MEME conceptual framework
  - Possibly the first implementation of the framework

- Feasibility study completed
- First report expected next year
### Council on Environmental Cooperation Recommendations

- **Air**
  - Percent of children exposed to air pollution exceeding national standards
  - Number of asthma cases

- **Toxic Substances**
  - Blood lead level
  - Children living in or near high sources of lead
  - Pesticides
  - Pollutant releases
  - Fish consumption advisories

- **Water**
  - Percent of children (households) served with treated water and sanitary sewers
  - Number of outbreaks of diarrheal disease
  - Morbidity and mortality (number of childhood illnesses/deaths attributed to water borne disease)

- **General health status and population characteristics**
The U.S. Approach: America’s Children and the Environment

- Second report
- Best available data
- Focuses on exposures and effects
  - Contaminants
  - Body burdens
  - Illnesses
  - Emerging issues
  - Special features
Concentrations of lead in blood of children ages 5 and under

90th percentile
(10 percent of children have this blood lead level or greater)

Median value
(50 percent of children have this blood lead level or greater)

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey
Relationship Between Lead in Gasoline and Mean Blood Lead Levels

NHANES II, 1976-1980

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<th>Year</th>
<th>Lead used in gasoline (thousands of tons)</th>
<th>Observed blood lead (mm/dL)</th>
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Year

Lead used in gasoline (thousands of tons)
Mean blood lead levels (μg/dL)

CDC
Median concentrations of lead in blood of children ages 1-5, by race/ethnicity and family income, 1999-2000

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey
Concentrations of cotinine in blood of children

**90th percentile**
(10 percent of children have this serum cotinine level or greater)

**50th percentile**
(50 percent of children have this serum cotinine level or greater)

**SOURCE:** Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey
Percentage of homes with children under 7 where someone smokes regularly

SOURCE: U.S. Environmental Protection Agency, Office of Air and Radiation, Indoor Environments Division, Surveys on Radon Awareness and Environmental Tobacco Issues
Measure E1

Percentage of children living in counties in which air quality standards were exceeded

- Ozone one-hour standard
- Ozone eight-hour standard
- Carbon monoxide
- PM-10
- PM-2.5
- Lead

SOURCE: U.S. Environmental Protection Agency, Office of Air and Radiation, Aerometric Information Retrieval System
Measure D1

Percentage of children with asthma

Children with asthma in the past 12 months

Children ever diagnosed with asthma

Children ever diagnosed with asthma and having an asthma attack in the past 12 months

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey

Note: The survey questions for asthma changed in 1997; data before 1997 cannot be directly compared to data in 1997 and later.
Measure B4

Distribution of concentrations of mercury in blood of women of childbearing age, 1999-2000

Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey

Note: EPA's reference dose (RfD) for methylmercury is 0.1 micrograms per kilogram body weight per day. This is approximately equivalent to a concentration of 5.8 parts per billion mercury in blood.
Children reported to have mental retardation, by race/ethnicity and family income, 1997-2000

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey
Measure E8

Percentage of fruits, vegetables, and grains with detectable residues of organophosphate pesticides

SOURCE: U.S. Department of Agriculture, Pesticide Data Program
Issues and Lessons

- Manageable project scope
  - Clear definition of “environment”
- Consensus on priority issues, clear rationale for selection
  - Important problems, common issues, political support
- Flexibility in the choice of indicators
  - National focus in issues and data collection
Issues and Lessons

- Criteria for selection
  - Scientific evidence of “association”, availability of data, usefulness, understandable

- Action (or policy) indicators
  - Useful for policy-makers? Target audience? Definition?

- Other indicators?
  - Economic and future/predictive
Early Conclusions

- MEME conceptual framework appropriate for children’s environmental indicators
  - Focus on exposures and effects
- North American implementation approach is practical and feasible
  - Use of available data and involvement of member countries in both planning and implementation
  - Getting started rather than waiting
- Possible implementation model for the Americas
  - Most upfront work completed
  - Small scale roll-out to a group of interested member countries