Introduction to *America's Children and the Environment, Third Edition*

THIS INFORMATION IS DISTRIBUTED SOLELY FOR THE PURPOSE OF PRE-DISSEMINATION PEER REVIEW UNDER APPLICABLE INFORMATION QUALITY GUIDELINES. IT HAS NOT BEEN FORMALLY DISSEMINATED BY EPA. IT DOES NOT REPRESENT AND SHOULD NOT BE CONSTRUED TO REPRESENT ANY AGENCY DETERMINATION OR POLICY.

EPA is preparing a new edition of *America's Children and the Environment* (ACE), following the previous editions published in December 2000 and February 2003. ACE is EPA's compilation of children's environmental health indicators and related information, drawing on the best national data sources available for characterizing important aspects of the relationship between environmental conditions and children's health. The main purposes of ACE are:

- To present concrete, quantifiable indicators of key factors relevant to the environment and children in the United States;
- To inform discussions among policymakers and the public about how to improve federal data on children and the environment; and
- To help policymakers and the public track and understand the potential impacts of environmental conditions on children's health and, ultimately, to identify and evaluate ways to minimize environmental impacts on children.

As with the previous editions, *America's Children and the Environment, Third Edition* (ACE3) is organized around the presentation of national indicators addressing key topics in children's environmental health, grouped into three main areas:

- **Environments and Contaminants**: levels of chemicals in environmental media to which children are routinely exposed (air, drinking water, and food), along with conditions of key aspects of children's environments (indoor environments, contaminated lands, and climate change);
- **Biomonitoring**: concentrations of contaminants measured in the bodies of children and in women of child-bearing age (such as lead and mercury measured in blood); and
- **Health**: trends in children's health outcomes (such as asthma and childhood cancer) that may be influenced by exposure to environmental contaminants or other environmental factors.

Like the previous editions, ACE3 will also include a "Special Features" section that contains information on important topics for children's environmental health for which national indicators cannot be developed, because no suitable national data set is available.

Several new topics of importance to children's environmental health have been added to ACE3, and topics included in the previous editions have been extensively revised and updated. EPA used an iterative process to select new topics for ACE that involved input

from the Children's Health Protection Advisory Committee (CHPAC)[1] on key children's environmental health issues, evaluating available databases, and identifying indicators that might be prepared using those databases.

The topics selected for ACE3 are:

Environments and Contaminants	**Biomonitoring**
Criteria Air Pollutants Hazardous Air Pollutants Indoor Environments Drinking Water Contaminants Food Contaminants Contaminated Lands Climate Change	Lead Mercury Cotinine Polychlorinated biphenyls (PCBs) Polybrominated diphenyl ethers (PBDEs) Perfluorochemicals (PFCs) Perchlorate Phthalates Bisphenol A
Health	**Special Features**
Respiratory Diseases Childhood Cancer Neurodevelopmental Disorders Adverse Birth Outcomes Obesity	Birth Defects Contaminants in Schools and Child Care Facilities

For each of these topics, indicators have been prepared that draw upon the best available databases to depict key aspects of the topic. For the most part, the indicators are derived from databases maintained by EPA, the Centers for Disease Control and Prevention, or other federal agencies. A complete list of draft indicators for ACE3 can be found starting on page 4.

For ACE3, an indicator is a quantitative depiction of an important aspect of children's environmental health that summarizes the underlying data in a relevant, understandable and technically appropriate manner.

A separate draft indicator document has been prepared for each ACE3 topic, and each includes the following content:

- Topic text to provide a discussion of why the topic is important to children's environmental health
- Indicator text describing the data presented in the indicator(s) and discussing the data source
- Graphical presentation of the indicator(s)

[1] The CHPAC is a group of researchers, health care providers, environmentalists, children's advocates, professionals, government employees, and members of the public who advise EPA on issues relevant to children's environmental health. CHPAC is convened under the Federal Advisory Committee Act (FACA). More information available at:
http://yosemite.epa.gov/ochp/ochpweb.nsf/content/whatwe_advisory.htm

- Bullet-point text highlighting key findings from the graph and other important details captured in the data tables (and in some cases providing additional information to aid in interpretation of the graph)
- Data tables with all of the values depicted in the indicator graphs and, in most cases, additional data that complement the information included in the graph
- References
- Metadata for each database used in calculation of the indicator(s)
- Methods text that provides documentation of the specific data sets and variables used in calculating the indicator(s), details of indicator calculations, and documentation of statistical testing.

Peer reviewers will now evaluate the scientific rigor associated with 42 proposed indicators (up from 26 in the previous report) and consider 23 children's environmental health topics (up from 15 topics in the previous report). EPA is particularly interested in peer reviewers' evaluation of the utility and appropriateness of the indicators in addressing the three principal objectives of ACE: a) to present concrete, quantifiable indicators of key factors relevant to the environment and children in the United States, and to offer a basis for understanding time trends for some factors and for further investigation of others; b) to inform discussions among policymakers and the public about how to improve federal data on children and the environment; and c) to provide indicators that can be used by policymakers and the public to track and understand the potential impacts of environmental contaminants on children's health and, ultimately, to identify and evaluate ways to minimize environmental impacts on children. EPA also looks forward to comment on the appropriateness of the comparisons being made for each indicator and whether other comparison populations and/or benchmarks may be informative to the public.

After completion of the current peer review and public comment phase, EPA will make revisions as needed to address comments and will prepare a draft ACE3 report. The draft report will be reviewed by other federal agencies, and EPA will make revisions as needed to address their comments, followed by further peer review as needed. EPA intends to publish the final report in 2011. The main text of the report will include the topic text, indicator text, background information, graphical presentation, and bullet points. All data tables and metadata will be assembled in appendices. The detailed methods documentation will not be included in the report itself, but will be made available online. The final report will incorporate updates for those indicators where newer data are available.

ACE3 Databases

As part of the process for selecting topics for ACE3, EPA identified relevant data sets and considered whether they would be useful for development of children's environmental health indicators. Criteria for evaluating the suitability of available databases included:

- Relevance to the topic

- Spatial representativeness of the data (national coverage, or representation of some substantial portion of the nation)
- Sound data collection methodologies and quality assurance procedures
- Availability of raw data (individual measurements or survey responses)
- Availability of documentation
- Ongoing (continuous or periodic) data collection, with relatively recent data available
- Comparability of data across time and space
- Ability to stratify data by race/ethnicity, income, and location (region, state, county, or other geographic unit)
- Superiority to alternatives.

A database need not meet all criteria to be considered for use in ACE3. For example, some databases cannot be stratified geographically but are excellent in other respects; inability to extract statistics for regions, states, or other geographic divisions does not preclude use of these databases. Determination of the suitability of a database therefore involves an overall evaluation that considers all of the criteria.

ACE3 Indicators

ACE3 presents one or more indicators to illustrate status and/or trends for each topic with a suitable database. For ACE3, an "indicator" is a quantitative depiction of an important aspect of children's environmental health that summarizes the underlying data in a relevant, understandable, and technically appropriate manner. In some cases, a topic is represented with multiple indicators that portray different aspects of the underlying data.

Criteria for evaluating indicators included:

- Relevant to the specified topic
- Appropriate summary of the underlying data
- Population-based data (e.g., the indicator takes the form of "percentage of children affected," or as defined points in the population distribution of values such as medians)
- Useful for portraying some aspect of children's environmental health, such as trends over time, comparisons among subpopulations of children, etc.
- Clear
- Transparent and reproducible
- Representative of changes over time and inclusion of up-to-date information
- Sensitive to changes in the condition of interest
- Robust (unaffected by changes in factors not relevant to the condition of interest)
- Representative of the entire population of children in the United States, or of a substantial portion of the child population
- Superior to alternatives
- Suitable for graphical presentation.

Some indicators presented in ACE may not satisfy all criteria. For example, some

indicators may lack suitable data for presenting a trend over a number of years, but present useful information for some relatively recent time period (a single year or set of years). Indicators that do not satisfy all criteria may still be considered suitable, particularly if they are superior to alternatives and are needed for representation of an important topic. Determination of the suitability of an indicator therefore involves an overall evaluation that considers all of the criteria.

List of All Draft Indicators for ACE3

Environments and Contaminants

- Criteria Air Pollutants
    - Percentage of children ages 0 to 17 years living in counties in which air quality standards were exceeded, 1999–2009
    - Percentage of children ages 0 to 17 years living in counties with exceedances of short-term air quality standards for ozone or $PM_{2.5}$, 2009
    - Percentage of days with good, moderate, or unhealthy air quality for children ages 0 to 17 years, 1999–2009

- Hazardous Air Pollutants
    - Percentage of children ages 0 to 17 years living in counties where estimated hazardous air pollutant concentrations were greater than health benchmarks in 2002

- Indoor Environments
    - Percentage of children ages 0 to 6 years regularly exposed to environmental tobacco smoke in the home, 1994 and 2005
    - Percentage of children ages 0 to 5 years living in homes with interior lead hazards, 1998–1999 and 2005–2006

- Drinking Water Contaminants
    - Percentage of children ages 0 to 17 years served by community water systems that did not meet all applicable health-based drinking water standards, 1993–2009
    - Percentage of children ages 0 to 17 years served by community water systems with violations of drinking water monitoring and reporting requirements, 1993–2009

- Food Contaminants
    - Percentage of apples, carrots, grapes, and tomatoes with detectable residues of organophosphate pesticides, 1998–2008

- Contaminated Lands
    - Percentage of children ages 0-17 years living within one mile of Superfund and Corrective Action sites that were not “Protective for People,” 2009

- Percentage of children living near selected contaminated lands by race, ethnicity and family income, compared with children's distribution in the general U.S. population, 2009

- Climate Change
  - Percentage of children ages 0 to 17 years living in counties with unusually high temperatures on three or more summer days, 1977–2008

Biomonitoring

- Lead
  - Lead in children ages 1 to 5 years: Median and 95th percentile concentrations in blood, 1976–2008
  - Lead in children ages 1 to 5 years: Median concentrations in blood, by race/ethnicity and family income, 2005–2008

- Mercury
  - Mercury in women ages 16 to 49 years: Median and 95th percentile concentrations in blood, 1999–2008

- Cotinine
  - Cotinine in nonsmoking children ages 3 to 17 years: Median and 95th percentile concentrations in blood serum, 1988–2008
  - Cotinine in nonsmoking women ages 16 to 49 years: Median and 95th percentile concentrations in blood serum, 1988–2008

- Polychlorinated biphenyls (PCBs)
  - Perfluorochemicals in women ages 16 to 49 years: Median concentrations in blood serum, 1999–2006

- Polybrominated diphenyl ethers (PBDEs)
  - PBDEs in women ages 16 to 49 years: Median concentrations in blood serum, by race/ethnicity and family income, 2003–2004

- Perfluorochemicals (PFCs)
  - Perfluorochemicals in women ages 16 to 49 years: Median concentrations in blood serum, 1999–2006

- Perchlorate
  - Perchlorate in women ages 16 to 49 years: Median concentrations in urine, by race/ethnicity and family income, 2001–2004

- Phthalates
  - Phthalate metabolites in women ages 16 to 49 years: Median concentrations in urine, 1999–2006

    - Phthalate metabolites in children ages 6 to 17 years: Median concentrations in urine, 1999–2006

- Bisphenol A
    - Bisphenol A in women ages 16 to 49 years: Median concentrations in urine, by race/ethnicity and family income, 2003–2006
    - Bisphenol A in children ages 6 to 17 years: Median concentrations in urine, by race/ethnicity and family income, 2003–2006

Health

- Respiratory Diseases
    - Percentage of children ages 0 to 17 years with asthma, 1997–2008
    - Percentage of children ages 0 to 17 years reported to have current asthma, by race/ethnicity and family income, 2005–2008
    - Children's emergency room visits and hospital admissions for asthma and other respiratory causes, ages 0 to 17 years, 1996–2008

- Childhood Cancer
    - Cancer incidence and mortality for children ages 0 to 19 years, 1992–2007
    - Cancer incidence for children ages 0 to 19 years by type, 1992–2006

- Neurodevelopmental Disorders
    - Percentage of children ages 5 to 17 years reported to have attention-deficit/hyperactivity disorder, by sex, 1997–2008
    - Percentage of children ages 5 to 17 years reported to have a learning disability, by sex, 1997–2008
    - Percentage of children ages 5 to 17 years reported to have autism, 1997–2008
    - Percentage of children ages 5 to 17 years reported to have intellectual disability (mental retardation), 1997–2008

- Adverse Birth Outcomes
    - Percentage of babies born preterm, by race/ethnicity, 1993–2007
    - Percentage of babies born at term with low birth weight, by race/ethnicity, 1993–2007

- Obesity
    - Percentage of children ages 2 to 17 years who were obese, 1976–2008
    - Percentage of children ages 2 to 17 years who were obese, by race/ethnicity and family income, 2005–2008

Special Features

- Birth Defects
    - Birth defects in Texas, 1999–2007

- Contaminants in Schools and Child Care Facilities
    - Percentage of environmental and personal media samples with detectable pesticides in child care facilities, 2001
    - Percentage of environmental and personal media samples with detectable industrial chemicals in child care facilities, 2001
    - Pesticides used inside California schools by commercial applicators, 2002–2007