

*Report of the Task Group
of the
Children's Health Protection Advisory Committee
on
America's Children & the Environment Report,
Third Edition*

Members of the Task Group

Laura Anderko, RN, PhD, Amy D. Kyle, PhD, MPH, Robert Leidich, Melanie Marty, PhD, Elise Miller, MEd, and Jerome A. Paulson, MD (serving as Chair)

America's Children and the Environment, Third Edition. Report of the Children's Health Protection Advisory Committee Task Group.

America's Children and the Environment (ACE) is the U.S. EPA's compilation of children's environmental health measures and related information, drawing on the best data sources available for characterizing important aspects of the relationship between environmental contaminants 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 contaminants on children's health and, ultimately, to identify and evaluate ways to minimize environmental impacts on children.

The first ACE report, *America's Children and the Environment: A First View of Available Measures*, was published in December 2000. The second report, *America's Children and the Environment: Measures of Contaminants, Body Burdens and Illnesses*, was published in February 2003. While the team at EPA which is responsible for this excellent document has been updating the 2003 document on the web on a regular basis (<http://www.epa.gov/envirohealth/children/>), it is now time to consider a thorough revision of this report.

Children's Health Protection Advisory Committee Process

In late 2008, the Children's Health Protection Advisory Committee (CHPAC) was approached by the National Center for Environmental Economics (NCEE) and the Office of Children's Health Protection (OCHP) for input and guidance on the proposed third edition of the ACE report (ACE3). CHPAC was asked to consider whether there was the need for a new edition of the ACE report and what new topics should be included in the next edition of the report. CHPAC created a Task Group (TG) which has met four times by phone (01-09-2009, 02-05-2009, 04-02-2009, and 05-19-2009) and once in-person (03-10-2009). This document reports on the activities of the CHPAC TG organized to provide input regarding ACE3.

The TG consists of Laura Anderko, RN, PhD, Amy D. Kyle, PhD, MPH, Robert Leidich, Melanie Marty, PhD, Elise Miller, MEd, and Jerome A. Paulson, MD (serving as Chair). At the March 10, 2009 face-to-face meeting, additional members of CHPAC participated: Henry Anderson, MD, Brenda Afzal, RN, MS (alternate for Barbara Sattler, RN, DrPH), Sophie Balk, MD David Jacobs, PhD, CIH, and Woodie Kessel, MD, MPH.

The CHPAC expects to review and provide input on a draft of the new edition of the document when it becomes available.

In the process of working with EPA staff, the TG reviewed the following documents:

1. "Plans for Development of *America's Children and the Environment, Third Edition*" dated 10-10-2008
2. "Body Burdens Scoping" document, dated 01-12-2009
3. "Proposed New Topics for Contaminants and Environments," distributed 02-27-09
4. "Scoping Document for New Illnesses/Health Topics," distributed 03-31-2009
5. "FEMA Disaster and Emergency Declarations Database," distributed 03-31-2009
6. "New Climate Scoping-FEMA Database," distributed 05-18-2009
7. "An Overview of Indoor Environment Data Sources," distributed 05-18-2009

Thoughts of the CHPAC Task Group on *America's Children and the Environment, Third Edition*

1. The TG agrees with EPA staff that the ACE3 should build upon the previous printed versions as well as the material added to the web site since 2003.
2. Several additional topics of importance to children's environmental health need to be added to ACE3, and topics included in the previous editions need to be extensively revised and updated.
3. New topics and measures should be incorporated into the existing structure of ACE. As previously, ACE3 should be organized around the presentation of national indicators addressing key topics in children's environmental health, grouped into three main areas:
 - Environmental Contaminants – levels of chemicals in environmental media that children are routinely exposed to: air, water, food, and soil;
 - Body Burdens - concentrations of contaminants measured in the bodies of children and in women of child-bearing age, such as blood lead and blood mercury; and
 - Childhood Illnesses – diseases and disorders in children that may be influenced by exposure to environmental contaminants, such as asthma and childhood cancer.
4. ACE3 should also include a "Special Features" section with information on important topics for children's environmental health for which national indicators can not be developed because no suitable national data set is available.
5. As in past ACE Reports, ACE3 should include extensive documentation for all information presented: 1) background text with key definitions and scientific findings; 2) full references to relevant scientific journal articles and government reports; 3) information presented in both tabular and graphic format; 4) where needed, supplementary tables to provide additional data not included in the graphic; and 5) metadata and detailed documentation on the calculation of all indicators. The latter should be made available online.

6. The TG agrees that all of the topics in previous ACE Reports should be included in ACE3 with appropriate updating.

7. While recognizing that not all databases proposed for use in constructing ACE3 will meet all of the criteria which have been proposed to determine the suitability of available databases, the TG believes that the proposed criteria listed here are excellent.

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

8. The TG also believes that even though some indicators used in ACE3 may not fulfill all of the proposed criteria for evaluating potential indicators for inclusion in ACE3, those proposed criteria listed here are excellent.

- Relevant to the specified topic
- An appropriate representation of the underlying data
- Population-based (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.
- Understandable
- Transparent and reproducible
- Representative of changes over time, and includes 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 U.S., or of a substantial portion of the childhood population
- Superior to alternatives
- Suitable for graphical presentation.

9. The TG thought that all of the Candidates for New Topics proposed for inclusion in ACE3 were worth considering. The TG made suggestions for where data might be found for some of these topics and how information about some of these topics might best be portrayed.

List of Candidate New Topics for ACE3 (*note – this is list of topics for which EPA requested Task Group Feedback*)

- 1) Environmental Contaminants
 - a) Proximity to Traffic (home/school)
 - b) In-vehicle exposures (cars, school buses)
 - c) Contaminants in the home (e.g., house dust)
 - d) Contaminants in school/day care
 - e) Radiation – UV, radon
 - f) Surface waters - recreation
 - g) Playgrounds

- 2) Body Burdens
 - a) Arsenic
 - b) PCBs
 - c) Dioxins
 - d) Polybrominated diphenyl ethers (PBDEs)
 - e) Organochlorine pesticides
 - f) Perfluorochemicals (PFOS/PFOA)
 - g) Bisphenol A
 - h) Phthalates
 - i) Perchlorate
 - j) Organophosphate pesticides
 - k) Pyrethroid pesticides
 - l) Volatile organic compounds (VOCs)
 - m) Polycyclic aromatic hydrocarbons (PAHs)
 - n) Cotinine (women of childbearing age)
 - o) Cumulative body burdens

- 3) Illnesses
 - a) Adverse birth outcomes (preterm birth and low birth weight)
 - b) Developmental Origins of Adult Disease
 - c) Pubertal effects (age at puberty)
 - d) Neurodevelopment (additional indicators, e.g. autism)
 - e) Later-life consequences of early-life exposures - fetal origins of health
 - f) Overweight/Obesity and diabetes

10. The ACE3 TG also made the following points about the overall plan for developing the ACE3 document:

- An issue that has received increasing attention in the past few years is the relationship of indicators to policy decisions. EPA may want to consider how indicators affect and inform policy decisions.
- Previous CHPAC reports and letters mentioned the benefits of cross-fertilization between government agencies. Many of these issues are difficult for any one

government agency to solve. ACE3 could include a special feature about inter-agency coordination, communication, and cooperation.

- ACE3 could consider some upstream indicators (e.g., sources of the contaminants) to move away from end of the pipe issues.
- The TG thought that it was important that EPA staff consider how understandable it can make an indicator to the general population as a criterion for inclusion.
- The criteria “substantial percent of the population” would vary by category.
- The TG agrees that EPA staff should use other reports to inform the ACE3 report.
- Reports that draw on the same datasets but come up with differing results can cause confusion. It is important for EPA staff to clearly explain any cases where it reports results different from those of other sources and to resolve any unnecessary differences as much as possible.
- It was noted that in previous editions, the indicators were limited to topics under EPA authority. The TG suggested that EPA may want to reconsider this bounding for the revised report. Members of the TG expressed the opinion that if there is a useful dataset and information could contribute to making good decisions about the health of children, indicators should be included no matter whose purview they fall under. There are areas that are important for children that are not clearly under the jurisdiction of any agency.
- It is appropriate that EPA identify topic areas of interest and importance for children first and then assess the availability of data for an indicator as a second step. This allows for the identification of important topic areas for which data are not available. Such findings should continue to be reported.
- The move towards electronic medical reporting will provide a wealth of data at some point in the future.
- The TG suggested that EPA staff should consider including an appendix or chapter at the end of the report on data needs, or include data needs sections at the end of each chapter.
- The majority of datasets that are not about environmental factors used in the report are from HHS. EPA staff should enhance the discussion about data collection and survey questions regarding important children’s health indicators. EPA staff should coordinate collaboration about data collection and datasets with other organizations (e.g., OMB, HHS, and CDC) with an eye to the future. EPA staff might want to consider including recommendations for who should be responsible for specific data collection needs.
- Many of these indicators are interconnected and could be linked under broad categories, such as consumer safety. The systems piece will become increasingly important.
- Clinicians are seeing an increasing number of developmental problems. While there is more data, clinicians do not know the cause for these trends. The report could discuss these issues.
- Some members of the TG thought that EPA staff may want to consider an overall summary indicator to provide an overall picture of whether children’s environmental health is getting better or worse.

11. During the discussion of Body Burden Indicators, ACE3 TG members made the following additional points:

- Of the chemicals EPA is considering developing body burden indicators for, the most useful would be arsenic, PCBs, PBDEs, PFOA, bisphenol A, phthalates, perchlorate, PAHs, and cotinine. The other classes of chemicals have either limited information for children, have already been a focus of much attention (e.g., DDT, dioxins and furans), are problematic in terms of kinetics and data (VOCs), or are otherwise of somewhat lesser concern.
- When testing for arsenic in patients, doctors usually tell the patients to not consume seafood for 3-5 days prior to testing because seafood can increase the positive detections of arsenic. It is unlikely that this was done for the NHANES data collection.
- Arsenic is an important body burden topic and recent findings demonstrate neurodevelopmental effects and greater degree of lung toxicity (including lung cancer) when exposure occurs early-in-life. Questions were raised about nationally comparative exposure and the inclusion of inorganic forms of arsenic, which has been shown to have greater toxicity than some organic arsenicals.
- A paper by Joe Braun published in *Environmental Health Perspectives* found significant risk for ADHD from second hand smoke.
- One CHPAC member noted there might be a rationale for considering revising the definition of “women of child-bearing age” from ages 16-49 to ages 16-39. While women ages 40-49 have a higher body burden of toxicants than younger women, they also have a fewer births. The TG advised that any change in definition should be made clear in the document.
- EPA can deal with the issues of non-detects for PCBs by focusing on the most prominent ones in the human food chain and in people, where there is a wealth of data.
- The amount of PBDEs, perfluorochemicals, bisphenol A (BPA), phthalates, and perchlorate in women of childbearing age would be valuable indicators and more important than levels in children over 6 years of age.
- Documenting cotinine levels in women of childbearing age and segregating that data by whether women smoke or not would be valuable.
- It would be valuable to include new indicators that reflect body burdens of chemicals that are in consumer products such as phthalates and BPA.

12. During the discussion of Candidate New Topics, ACE3 TG members made the following additional points:

Proximity to Traffic (Homes/Schools)

- EPA may want to consider including traffic deaths in the text of the indicator, and possibly mentioning how that has been impacted by cell phone usage.
- In-vehicle exposure does not seem to fit into the rest of the category, and might be better placed with Children’s Environment or deserves its own category. The bad environment of a school bus is independent of what road the bus is on.
- Evaluating the proximity of roads to schools may be more feasible than to homes because they can be more easily located and there are far fewer data points to handle.

- When looking at air toxics around schools, it is hard to separate out air toxics from roadways and air toxics from other sources (e.g., factories). Buses idling are another source of toxics.
- It would be interesting for the agency to consider doing an analysis of air toxics in schools by using the National Air Toxics Assessment (NATA).
- After further consideration the TG agreed that proximity indicators did not appear to be very promising because: we know in advance there will be little (if any change) from year to year, given the design of the indicator; and the indicator does not capture key elements of the exposure (e.g. proximity to roads doesn't tell us about changes in fleet composition and fuels or VMT over time).

UV Radiation and Radon

- ACE3 may want to address the issue of exposure via tanning salons. Approximately 25 percent of teenagers report using tanning facilities at least once in their life. This would impact cumulative exposure. Melanoma is increasingly seen in young people in their twenties, particularly women.
- UV exposure is related to seasonality. NOAA has daily values of UV.
- ACE3 should acknowledge both the benefits and the harm of UV exposure. One of the benefits is vitamin D production. Given that there are benefits and harms, the TG recognized that it would be difficult to craft an indicator for UV radiation.
- Another related indicator may be chemical exposure from sunscreen use. A broader indicator for body burdens may be exposure to sunscreen chemicals from cosmetics.

Recreational Surface Waters

- ACE3 may want to consider expanding the topic to include other surface waters and use water quality data sets such as National Water Quality Assessment (NAWQA) from the USGS

Contaminants in Children's Indoor Environments

- It would be interesting, but difficult, to look into the persistence of banned pesticides in homes as well as how newer non-persistent pesticides enter homes when they are for outdoor use.
- All schools use pesticides; however, there may be variation between states. California has some requirements for reporting pesticide use in schools; useful data may be available from the California Department of Pesticide Regulation. The TG thought that lead in house dust should be reviewed as a possible indicator. Data on lead in house dust from HUD may be useful to use to develop an indicator.

Playgrounds

- It would be difficult to develop indicators related to children's exposures on playgrounds, primarily based on a lack of information.

13. During their discussions, ACE TG members also made comments general to all indicators. These include the following:

- What are the (policy) implications of these indicators?
- EPA staff may want to consider trying to link indicators together and find the commonalities, and to take into account factors such as nutrition and socio-economic situation.
- Include some discussion of cumulative impacts. Some key papers were published in the past couple years looking at the impact of lead on children by stress level. There are also interactions with nutrition.
- Consider including a knowledge indicator, which should show how much science tells us or does not tell us. One possibility is the number of chemicals with complete datasets over time.
- Incorporate systems to acknowledge the greater need to work together across the Agency and with agencies outside of the EPA.
- There is not enough time to include data from the National Children's Study in the revised ACE report.
- NGOs are another potential source for data. For example, the Environmental Working Group has done some analyses of PDBEs in toddlers and mothers.
- Emphasize in the definition of an "indicator" that these are indicators of something of concern, and are not a direct biological truth measure.

There was a discussion about changing indicators from previous versions of ACE to the planned ACE3.

- EPA should be very clear why changes were made to indicators and definitions to avoid confusion and to increase transparency.
- Presenting the 95th percentile rather than the 90th is important as it includes more of the children at risk for exposure.
- ACE3 should frame targets using a frame of reference to provide context to readers, who can then better understand how a particular indicator is improving or worsening.

There was a discussion about a proposed indicator for ADHD. The TG felt that this was an important topic area. ADHD should be included as an indicator, using the best available data and with all of the appropriate caveats, to alert the audience that the potential association between environmental exposures and ADHD may require further attention.

During the discussion about adding new Illnesses/Health Topics to ACE3, the TG discussed many ways of approaching the topics. They suggested using prevalence of illness to determine its importance, and to look at adult health issues in relationship to childhood environmental exposures. A narrative could discuss the approaches put forth by the EPA. The narrative can be either for the report overall or topic specific.

For the Adverse Birth Outcomes topic, the TG suggested that preterm birth and low birth-weight are important indicators, because of their association with other health problems

both in childhood and adulthood. There are a lot of data concerning these topics and they are worth including in the ACE report.

The Developmental Origins of Adult Disease should be incorporated, where appropriate, into other topics in ACE3. The discussion focused on Parkinson's disease as an indicator. The TG noted that indicators in this topic would most likely depend on the timeframe of the exposure being discussed (e.g., prenatal, postnatal, early childhood). It seems that the strongest available data relate exposure to air pollutants to respiratory function, including the decrease in adulthood lung function after childhood exposure. Cancer is also an adult disease related to childhood exposure to carcinogens, but because it is so multifaceted, it is hard to handle effectively. The TG encouraged EPA to discuss cancer in the section on developmental origins of adult disease, and suggested that data on organ-specific cancer incidence would be more manageable for the scope of the report. The TG felt it was important to try to explain this concept of early life exposure resulting in elevated cancer in adults as part of the report.

The TG discussed Age at Puberty. They suggested that it is a growing concern due to the prevalence of endocrine-disrupting substances in the environment, and should be an ongoing consideration. As data and information becomes available, EPA can add it to the report.

Neurodevelopment is already a topic addressed in the ACE3 report. The TG suggested looking into BPA and perchlorate data, and to discuss in the text the fact that a variety of environmental toxicants can lead to similar neurodevelopmental health outcomes. The TG supports including an indicator for autism and autism spectrum disorders in ACE3, and to include a discussion of the data indicating a potential role of environmental exposures.

Issues related to diabetes and obesity as possible indicators were discussed. The TG stated that it is extremely important to differentiate between Type 1 and Type 2 diabetes in the ACE3 report, and if it is not possible to distinguish between the two types in the data, then it might be less useful to include the indicator.

The TG suggested including text on the effects of Climate Change specifically on children, but not making a disease indicator related to climate change.

Possible Uses of ACE3

- Indicators in the ACE3 Report could be used for strategic planning purposes in EPA and other federal agencies
- Indicators in the ACE3 Report could be used in the formulation of the next iteration of Healthy People goals
- Indicators in the ACE3 Report could be used in public communications to indicate achievements of the Agency
- Indicators in the ACE3 Report could be used to identify needs for further research
- Indicators in the ACE3 Report could be used to identify needs for data collection

- Indicators in the ACE3 Report could be used to identify issues needing inter-agency coordination/collaboration

Summary

The ACE3 TG feels that the ACE report is an excellent document and deserves revision and publication. It is important for EPA to take stock of the impact of the environment on children's health and report that information throughout the agency, to the rest of the executive branch, to Congress, to parents, pediatricians and others concerned about children's health, and to the nation as a whole. There is a need for a single document that includes information about measurable environmental health indicators and that highlights those issues where our knowledge is limited but which need monitoring and further research. The ACE3 TG recommends that EPA support the revision of the ACE report and its dissemination. Further recommendations, coming from the entire Children's Health Protection Advisory Committee, and based on this Report will be in the cover letter that accompanies the Report.

