

EDITORIAL

Ensuring a Bright Future for Children's Environmental Health



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In 1993, the National Academy of Sciences first coined the phrase, "Children are not little adults" to describe the unique vulnerability of children to pesticides and other environmental chemicals. In the 22 years since, a critical mass of researchers in diverse fields has been working to improve children's health by understanding and reducing environmental exposures, both in the United States and internationally.

Significant national milestones include the formation of the National Institute of Environmental Health Sciences and the US Environmental Protection Agency Centers for Children's Environmental Health and Disease Prevention Research as well as the launch of the National Children's Study and other prospective cohorts. Internationally, efforts in India to ensure safe drinking water, aggressive antismoking campaigns in many nations, and reduction of lead in gasoline in Thailand, the Philippines, India, and Pakistan were followed by a landmark International Conference on Environmental Threats to the Health of Children, held in Bangkok, Thailand, in 2002. Since then, environmental health scientists, public health professionals, and pediatricians in Southeast Asia and the Western Pacific launched efforts to build research and prevention programs to reduce children's health threats caused by environmental exposures.

Today, nearly every national and international environmental health scientific meeting includes a subfocus on children, whether a day-long workshop or a shorter symposium. Study of environmental exposures in children is the focus of several national networks in the United States and is also a priority for several global health research networks. Bringing together frontline pediatricians and other children's

health care workers with environmental health researchers no longer seems like a novelty, as it did when the National Institute of Environmental Sciences Superfund Basic Research Program convened a pediatric environmental health conference in 1993 and the Children's Environmental Health Network held its first research conference in 1998. At international meetings, it is our experience that clinicians on the front lines in low- and middle-income countries often express an interest in children's environmental health (CEH) as they look for causes for increased stunting and diseases of unknown origin they see in their patients.

Although much work has been done to increase collaboration between basic researchers and clinical scientists in CEH and to assess exposures to children and understand their effects, some goals articulated 20 years ago are still elusive today. We still see a pressing worldwide need for better overall assessments of the toxicants children are exposed to at the local, country, and regional levels, including mixtures of chemicals. In addition, although our understanding of the interactions between infectious diseases, environmental exposures, and genetics and individual disease susceptibility has improved since the need was outlined more than 2 decades ago, that understanding is still quite limited. The effects of low-dose exposures and chemical mixtures are poorly understood in children. (This situation is not much better in adults!)

Internationally, progress has been made in reducing child mortality overall, but disparities between developed and developing countries are vast and obscure pockets of high mortality among those most vulnerable to environmental insults. The majority of deaths in children younger than age 5

occur in low- and middle-income countries, the same subset of countries in which environmental pollution is becoming increasingly rampant. In Latin America, for instance, rapid industrialization has led to widespread environmental pollution, and traditional environmental threats such as indoor air pollution and drinking water contamination are joined by newer problems such as urban air pollution; pesticides, asbestos, mercury, and other chemicals; hazardous waste from computers and other electronics; and climate change. The combination of traditional and modern threats varies from country to country and even within different regions within a country, depending on economic development and industrialization. Climate change will only aggravate these issues.

Just as new threats to children's health have emerged, so have new concepts for understanding how exposures affect child health. For example, researchers increasingly recognize that the environmental exposures that have the most impact may be those that happen before birth. Recent evidence shows that the fetus has a biological response to carcinogens in the mother's diet. Not only can exposures during pregnancy cross the placenta, they also can affect placental physiology and

health, interfere with growth and development, alter nutrient uptake, or modify metabolism and hormone levels. Any of these changes can cause long-term health consequences; many may not be reversible. Measuring and intervening upon these exposures will challenge the field to develop better exposure assessment methods. For instance, sensitive and specific methods to assess real-time placental exposures and study chemically induced placental damage in early pregnancy are needed.

To completely assess the progress made in CEH and set the agenda for the next 25 years, we see a pressing need for a fourth international Children's Environmental Health conference. With many areas of focus competing for attention, a coordinated approach is needed to determine priority areas in moving the field of children's environmental health into its next era. Chronic, noncommunicable diseases caused by environmental pollution are problems that receive little attention in the international development agenda. To combat this already rampant problem, we must turn attention and resources to developing a comprehensive agenda for understanding the most dangerous environmental exposures in children and how to prevent associated disease.