A Growth Spurt in

Those tracking the growth of children's environmental health policy can put a check mark much higher up the doorjamb since last year, thanks to

Children's Health Laws

a host of legislative initiatives that have been advanced since midsummer 2000. These initiatives have pushed forward an unprecedented agenda for reducing environmental threats to the young.

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The largest epidemiologic study ever attempted of environmental exposures and their effects on children is now under way. And government agencies addressing programs from health to housing are working together on coordinated research strategies. The need is urgent: levels of several pediatric illnesses with suspected links to the environment are growing throughout the United States. Rates of asthma, for example, have achieved epidemic proportions, nearly doubling for all children under age 17 since 1980, according to the Centers for Disease Control and Prevention (CDC). Neurodevelopmental conditions such as autism, a variety of behavioral problems, and birth defects, all suspected of being influenced by environmental exposures, are also on the rise.

A Charge to Consider Kids

Regulatory efforts in children's environmental health have been steadily building since 21 April 1997, when President Bill Clinton issued Executive Order 13045. The executive order mandated federal agencies to specifically consider children in the development of environmental standards and regulations. The order also created an interagency coordinating group called the President's Task Force on Environmental Health Risks and Safety Risks to Children and charged it with developing research strategies to carry out its goals. The task force, which is cochaired by the secretary of the U.S. Department of Health and Human Services (DHHS) and the administrator of the U.S. Environmental Protection Agency (EPA), has identified four priority areas in children's health and safety: asthma, developmental disorders, childhood cancer, and unintentional injury.

Ramona Trovato, director of the EPA Office of Children's Health Protection, emphasizes that policy makers are reaching across federal agency walls to coordinate children's environmental health programs. "It's important that our efforts support each other and don't overlap," she says. "It requires a lot of interagency planning to fill gaps in the knowledge. . . . The children's health initiatives we've been developing could have never happened without the president's task force pulling it all together." Although the task force is slated to disband in September 2001, Trovato suggests that high-level government officials are inclined to extend the group's active status indefinitely.

Perhaps the most important recent policy development in children's health is the Children's Health Act of 2000, signed into law on 17 October 2000. The act's provisions are broad, covering issues that include improved research and treatment on pediatric health problems, better quality of mental health care, and efforts to combat drug use and youth violence, among others. Environmental health provisions are numerous and interspersed throughout the act. The children's environmental health component with the highest visibility is contained in Title X, which authorizes the largest epidemiologic study on the effects of environmental exposures on child health ever conducted. The Longitudinal Cohort Study of Environmental Effects on Child Health and Development (LCS) will gather data on environmental exposures experienced *in utero* and during childhood, and will monitor health outcomes in up to 100,000 children through at least 21 years of age. The LCS, which is now in transition from the planning to the pilot project phase, is scheduled to begin in 2004 if sufficient appropriations are approved by Congress. Peter Scheidt, a medical officer at the National Institute of Child Health and Human Development (NICHD) and

director of operations for the study, says, "The LCS will provide some badly needed information linking environmental exposures to disease and also provide us a rich database from which to generate future research hypotheses."

Responsibility for coordinating the LCS is divided equally between three federal agencies: the NICHD, the EPA, and the CDC. According to Sherry Selevan, an epidemiologist with the National Center for Environmental Assessment at the EPA's Office of Research and Development (ORD) and EPA cochair of the LCS, three broad areas of study have been proposed thus far. One deals with the issue of prenatal exposure to chemicals and the potential for increased risk of certain neurodevelopmental conditions, such as autism. Another addresses how prenatal and early childhood environmental exposures interact with the immune system to influence asthma incidence and severity. And the third focuses on individual, family, and community influences on childhood injury. Selevan says these areas of study are preliminary and subject to change.

This year, Selevan and her colleagues at the CDC and the NICHD will be working with a variety of work groups to firm up hypotheses for testing and deal with a staggering array of procedural details. "Designing a study involving 100,000 kids and then keeping it going for twenty to thirty years is a tough job, and it takes a lot of serious planning," she says. Currently, study team members are organized around a series of work groups, each of which will initiate pilot studies in specific areas. These include methodologies for measuring environmental exposure, screening tools to measure neurodevelopmental outcomes, issues associated with information technology (for example, tracking study subjects using the Internet), ethics, community outreach, and sample collection, storage, and archiving. Woodie Kessel, co-executive director of the president's task force, adds that evaluating the effects of gene–environment interactions will also make up a critical aspect of the study and that a work group in this area is likely to be formed soon.

PhotoDisc, Reuther/EHP

More Emphasis on Asthma

With at least 4.5 million cases, asthma is among the most critical children's environmental health problems today. Scientists are well aware of environmental triggers for asthma such as mold, dust, and cockroach dander, but very little is known about the pathogenesis of the disease.

Under the Children's Health Act, the National Asthma Education and Prevention Program (NAEPP) of the National Heart, Lung, and Blood Institute is directed to improve coordination of asthma programs throughout the government. The NAEPP comprises 40 national health organizations representing government agencies, academic researchers, clinicians, and patient advocacy groups. Its coordinator, Diana Schmidt, says the NAEPP has been meeting regularly over asthma-related problems since 1989. "All the federal agencies working on asthma programs are linked through the NAEPP, and representatives get to know each other personally," says Schmidt.

Title V of the Children's Health Act mandates that the group investigate federal research programs on asthma and produce a report describing ways to strengthen and improve coordination of asthma-related activities. As it tackles this responsibility, the NAEPP is drawing heavily off two recent federal efforts in the area of childhood asthma. In one, the DHHS tallied priorities and set an agency-specific asthma research and outreach strategy covering all age groups. This effort culminated in the DHHS report *Action Against Asthma: A Strategic Plan for the Department of Health and Human Services*, which was released in May 2000. In the second effort, the president's task force evaluated government-wide programs on asthma as they relate to children specifically and made recommendations on how those programs might be improved. This effort produced the report *Asthma and the Environment: A Strategy to Protect Children*, also released in May 2000.

According to Schmidt, the NAEPP's current task will expand on these efforts through wider consultations with stakeholders both within and outside the government. It will also provide an update of agency programs and ensure they aren't overly fragmented or duplicative. Ultimately, says Schmidt, solutions to the asthma problem will come from expanded research and community outreach. "Both are equally important," she says. "It's

important to stimulate grassroots efforts and work with communities to find out what their needs are."

Autism Rises in Prominence

Besides asthma, the Children's Health Act also places a high priority on several other pervasive childhood environmental health problems. One in particular is autism, a disease growing in national visibility thanks in part to the efforts of advocacy groups such as Cure Autism Now, which is based in Los Angeles, California. Prevalence data for autism are poor, says Coleen Boyle, director of the Division of Birth Defects, Child Development, and Disability and Health at the CDC. The most commonly cited data estimate the prevalence at 1–2 cases per 1,000 births, she says.

Cure Autism Now vice president Jonathan Shestack says data from all the state departments of health are showing sharp increases in rates of autism throughout the country. "We're seen upwards of a one hundred fifty percent rise in autism during the last ten years," he says. "Some of the increase might be attributed to improved diagnosis, but not all of it. It would be naive to think there isn't an environmental component. We know the environment is linked to asthma, cancer, and a host of birth defects; why not autism?"

Title I of the Children's Health Act authorizes a federal war on autism, including enhanced epidemiological work by the CDC, the formation of "centers of excellence" for autism research under the auspices of the NIH, gene and tissue banking to facilitate research, and education programs on autism for the medical community and the public at large. Currently the CDC is preparing a request for proposals that will fund four autism centers in universities and state departments of health, each at a cost of between $500,000 and $800,000. Boyle says these centers will likely address genetic and environmental factors in a broad sense.

The NIEHS has also begun to research the disease, to an enthusiastic reception from the autism community. In February 2001, the institute issued a program announcement titled "Research on Autism and Autism Spectrum Disorders" (PA-01-051) encouraging grant applications for research "designed to elucidate the diagnosis, epidemiology, etiology, genetics, treatment, and optimal means of service delivery in relation to autism."

New Center on Birth Defects

An additional provision of note in the Children's Health Act is a mandate to create a national center devoted specifically to the problem of birth defects, which according to Boyle affect nearly 17% of all children born in the United States. In accordance with this mandate, the newly created National Center on Birth Defects and Developmental Disabilities will be located at the CDC under the acting directorship of José Cordero. According to Boyle, the focus of the center will be birth defects surveillance, epidemiology, education, and communications. Boyle says the formation of the birth defects center is a victory for advocacy groups around the country, and she expresses optimism that the center will help to raise visibility for these problems within the federal government.

Interagency lead programs, particularly those pertaining to a president's task force strategy to eliminate lead poisoning in children by 2010, continue to maintain a high-priority status. A key agency in this strategy is the Department of Housing and Urban Development (HUD). According to David Jacobs, director of the department's Office of Healthy Homes and Lead Hazard Control, HUD is spearheading efforts to provide assistance to privately owned low-income housing units, where the risks of lead poisoning are greatest. This assistance includes grants and leveraged private funding to eliminate lead-based paint hazards. Furthermore, HUD is coordinating 600 training courses that will be offered to maintenance and housing rehabilitation workers throughout the country this year. Finally, HUD is working with the EPA to enforce lead-paint dislosure regulations that obligate sellers and landlords to inform potential buyers and renters about lead-based hazards in the home.

EPA Presents New Strategy

In addition to the Children's Health Act, another key policy development in children's environmental health is the creation of the ORD's Strategy for Research on Environmental Health Risks to Children, which was finalized in October 2000. The strategy lays out a prioritized agenda for children's environmental health research throughout the ORD, with the goal of reducing some of the uncertainty in EPA risk assessments for children. Gary Kimmel, a developmental toxicologist with the ORD, says the office's labs have traditionally operated more or less independently of each other. "But with the direction we're moving in now, we'll be looking at what all the labs are doing in a broader context," he says. "This is the first time we've attempted to do this for children's health with a coordinated strategy behind us."

The ORD strategy establishes a core group of priorities designated either high, medium, or low, according to their potential to improve childhood risk assessment or otherwise reduce risks to children. Most activities geared toward reducing uncertainty in risk assessment and developing improved risk assessment models are given a high-priority status. Efforts to characterize variation in human susceptibility and cumulative risk are seen as medium priorities, whereas developments in "multimedia control technologies" are generally given low priority.

The ORD divides the implementation of the strategy in two ways: "short-term outputs" refers to tangible accomplishments that further progress in a particular area, and "long-term outcomes" refers to improvements in broad themes. For example, linking developmental effects at the tissue, organ, and system level with underlying cellular mechanisms might be seen as a short-term accomplishment advancing the long-term goal of improving extrapolations of animal data to developmental responses in humans.

Says Kimmel, "What this is all about is improving our understanding of toxicology in order to improve risk assessment. We'll be incorporating more and more studies that focus on specific organs and molecular mechanisms in addition to effects on the whole animal. The whole field is moving in that direction, and our children's risk strategy incorporates that trend."

As children's environmental health programs keep growing and developing, a continuing challenge will be to funnel research findings into improved care. Daniel Swartz, executive director of the Children's Environmental Health Network, a Washington, D.C.–based advocacy organization, says, "We're at the beginning of a process here. We have to continually strive to combine research, clinical practice, and community outreach in order to provide improved care for the child. That kind of integration isn't happening as fast as it should." An important part of that integration, says Swartz, is to improve environmental health training among clinicians in the field. When you have this, he says, "it can make a huge difference."

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