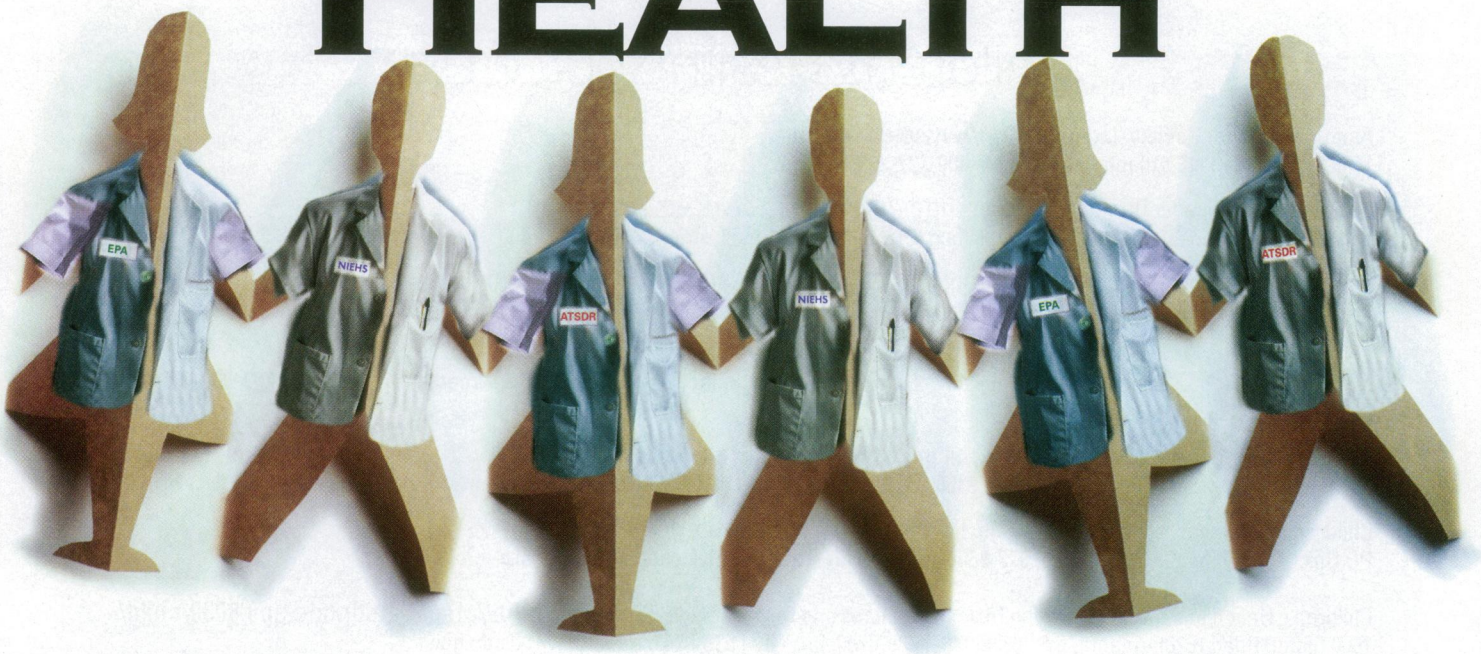
Joining Forces for Children's Health



Most children have a few things in common: they play a lot, they eat a lot, and they grow fast. Ironically, this healthy way of life puts kids at environmental risk. From pesticides on fruit to lead-laden playground dirt, children probably encounter more pollutants in relation to their size than adults. Because their bodies are still developing, children may react more strongly to toxins, too. Researchers have made some great discoveries into how children in particular are affected by their environment, but much more needs to be learned to protect these youngest members of society.

The NIEHS is one agency working to uncover how a host of hazardous agents specifically affect children. Together, the NIEHS and the EPA are spending $10 million annually for up to six centers for children's environmental health and disease prevention research. The CDC, a third partner, will help apply center research findings to public health. Each center—to be named in August 1998—will receive a grant of up to $1 million each year for five years.

"These centers represent an exciting approach to engaging community-based groups in academic research programs and addressing information gaps, especially in the area of prevention," says Samuel Wilson, deputy director of the NIEHS. "The programs offer an opportunity to foster interaction between academic environmental health scientists and agencies involved in translating research findings into public health impact."

The NIEHS–EPA effort reflects a wave of federal interest in protecting children from environmental health risks. Historically, environmental science and regulation have focused on the average U.S. adult, never addressing a child's unique physiology and exposure routes. But skyrocketing rates of childhood diseases such as asthma and leukemia have alerted researchers to the need for refocusing research on children's health. This attention is now also being reflected in government policy.

In April 1997, President Clinton issued an executive order for government agencies to focus research on children and created a multiagency task force to organize the effort. Meanwhile, the EPA established the Office of Children's Health Protection (OCHP). In 1996, the Agency for Toxic Substances and Disease Registry (ATSDR), a division of the Department of Health

and Human Services, also launched a child health initiative, designed to study and promote the health of children living near hazardous waste sites.

A Step Farther

The new centers will take children's health research a step farther. Each center will tackle a specific health condition with a blend of basic science and community intervention. "It's pretty unusual in the NIH and the EPA basic research worlds to do a cross-sectional focus on one issue, all the way from the lab to the street," says Steven Galson, science director of the OCHP. To define the centers' research missions, Galson says, the EPA and the NIEHS ventured beyond health conditions such as lead poisoning and cancer, which already attract significant research dollars. "We were looking for things that weren't at the top of government funding," he says.

The centers will focus on three research areas: respiratory disease, childhood learning, and growth and development. Respiratory diseases to be studied will include asthma, allergy, and chronic obstructive pulmonary disease. The toxins involved in these diseases include ozone, nitrogen dioxide, and particulate matter. To explore childhood learning, centers will focus on low-level exposures to polychlorinated biphenyls (PCBs), mercury, lead, and other toxins linked to learning disabilities or hyperactivity. In looking at growth and development, other centers will study *in utero* and postnatal exposure to endocrine disrupters and other organic solvents, heavy metals, and agricultural chemicals. No matter what its disease focus, each center will ask the same questions: how are kids exposed to environmental hazards, what are the resulting health effects, are some children more susceptible than others, how can adverse health effects be prevented and future risk managed, and how can researchers carry all these findings into a community and apply them.

Every center will spend 30–45% of its budget on two basic research projects to explore an environmental agent's disease mechanisms. Such projects might include studies of cellular and molecular toxicity, pathophysiology, epidemiology, or individual susceptibility. A third project, using 20–30% of a center's budget, will transfer the research into a community-based intervention/prevention program—for example, by partnering with local health departments and other organizations. The goal is to first learn about environmental hazards specific to a community and then figure out how to intervene.

Researchers and health advocates applaud this "bench-to-bedside" approach, but caution that it will be challenging. "I think the concept is wonderful," says Norman H. Edelman, consultant to scientific affairs at the American Lung Association and dean of the medical school at the State University of New York at Stonybrook. "The more you look, the more you see [that] the environment plays a critical role in triggering asthma, for example. My only question is, is it too ambitious to try to measure bench science and applied science in a single center? What you want to support is the very best science. If you get a group that can do great environmental controls but doesn't have the bench science, you could be doing a disservice to the purpose."

Planning basic science with intervention in mind isn't easy, agrees Lorne Garrettson, a pediatrician at Emory University in Atlanta, Georgia. "Everyone is going to find that's the hardest part," Garrettson says. "[Also,] the longer you have to follow a research cohort in order to get results, the less likely the research will be done. There are few research projects that follow a cohort 5 or 10 years."

One way to coordinate the science is by collaborating, responds Allen Dearry, an extramural project officer at the NIEHS. "In certain cities, there are a number of different academic institutions," Dearry says. "One will have expertise in monitoring, another in intervention, and another in basic science. We're trying to encourage places like that to put in a consortium application. The way to think of a center is [to ask] what value does the center structure add."

Community Considerations

For many researchers, working hand-in-hand with community members will be a new opportunity. This kind of collaboration is crucial, says Robert Amler, chief medical officer at the ATSDR. For more than a decade, the ATSDR has worked with communities near Superfund sites to identify and prevent health effects from hazardous waste. "The major lesson we've learned is that you have to involve communities and families from the onset of project planning," Amler says. That means recruiting families' input on study design, clinical endpoints, and intervention, he adds.

Pediatricians have an advantage when it comes to community-based study, remarks Cynthia Bearer, a pediatrician at Case Western Reserve University in Cleveland, Ohio. "As a pediatrician, I know that my most important ally in taking care of my patients is Mom and Dad," Bearer says. "That's not necessarily something that translates into other fields of research."

To successfully link with the community, scientists must appreciate what community members bring to the table, says Lawrence Schell, an epidemiologist at the State University of New York at Albany. Schell is studying the effects of PCB exposure on Mohawk adolescents. "The essence, I think, is recognizing that it's a two-way street," Schell says. "The community learns about public health and environmental science. The scientists may learn interesting questions about the community's concerns that demand investigation of new data." Schell notes that successful projects require community liaisons—leaders in the community who travel to scientific and community meetings where they learn about environmental hazards and can, in turn, educate others. "I hope the NIEHS and the EPA are willing to [budget money to] support these people," Schell says.

Overall, children's organizations see the centers as an important step toward controlling environmental pollutants. "The validity of the science, like environmental biomarkers, is going to have tremendous influence on industry," says Nancy Chuda, executive director of the Children's Health Environmental Coalition, a children's advocacy organization in Malibu, California. "There are industry people who say that, based on their science, there are no human effects from some pollutants. The only way we're going to prove otherwise is by looking at human examples. The centers will provide that." Joy Carlson, director of the Children's Environmental Health Network in Emeryville, California, points out that some 75,000 chemicals are in use in the United States. The proposed centers—the concept for which arose out of a 1994 meeting co-sponsored by the network, several federal agencies, the Packard Foundation, and the Medical University of South Carolina—can lay the groundwork for understanding the effects of these complex chemicals on children, says Carlson, but federal and private research efforts must pick up the ball and run with it.

Garrettson thinks that will happen. Life at a center will include regular brainstorming sessions revolving around the latest research. These meetings will inspire not just the faculty, but its audience—the medical and graduate students watching. "The next thing you know," Garrettson says, "you've got another generation of people studying environment and development." And the achievements of that generation may make life safer and healthier for generations to come.

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