

## Pesticides Initiative: Basic Training for Health Care Providers

Getting the U.S. health care world to adopt the tenets of the recently launched Pesticides Initiative may be a tough sell, according to participants at a June 2003 national forum to further the effort, held in Washington, D.C. Doctors and nurses have only so much time for continuing education, and competing educational priorities limit the interest in and knowledge of several environmental health issues. But the initiative is a campaign that the forum's 100-plus participants are committed to promoting, because they agree upon the importance of incorporating environmental health into primary care education and practice.

The U.S. Environmental Protection Agency (EPA) and the National Environmental Education & Training Foundation (NEETF), in collaboration with the Department of Health and Human Services, the Department of Agriculture, and the Department of Labor, developed the 10-year Pesticides Initiative. Unveiled

last summer, the initiative will help bring basic training in environmental health to medical and nursing education by fostering curriculum development, faculty leadership, and incentives for teaching on the subjects of environmental health and pesticides. "The front line of health care is about being an educator, particularly with issues like the environment," asserts NEETF president Kevin Coyle.

### A Call for Education

According to the 2001 annual report of the American Association of Poison Control Centers Toxic Exposure Surveillance System, pesticides are one of the substances most frequently involved in poisonings, with more than 90,000 incidents reported for 2001. Although fatal pesticide poisoning is rare among the general population, with only 17 deaths reported in 2001, initiative advocates contend that many exposures are not tracked. There is also still the question of what the effects of low-level exposures might be, especially cumulatively. Children are of primary concern, as they are among the most vulnerable populations. Theories abound that pesticides may contribute to increasing rates of asthma, obesity, autism, and other diseases, as well as to subtle but serious dysfunction and adult-onset conditions such as Parkinson disease.

The goal of the initiative is to improve the way primary health care providers assess and respond to potential pesticide exposure cases in their daily practice. The Pesticides Initiative calls for all primary health care providers to acquire basic knowledge of the health effects of pesticides and the treatments and preventive strategies used to address those effects.

The Pesticides Initiative is "an excellent model to apply to other environmental health issues," says Leyla Erk McCurdy, senior director of NEETF. The implementation of the initiative will not only help primary health care providers address pesticides, but also, Coyle says, "practitioners and educators will have a larger understanding to address other kinds of exposures within the environment." For example, skills acquired to take medical histories from patients may be applied to diagnose and treat other environmentally induced health problems.

### The First Line of Defense

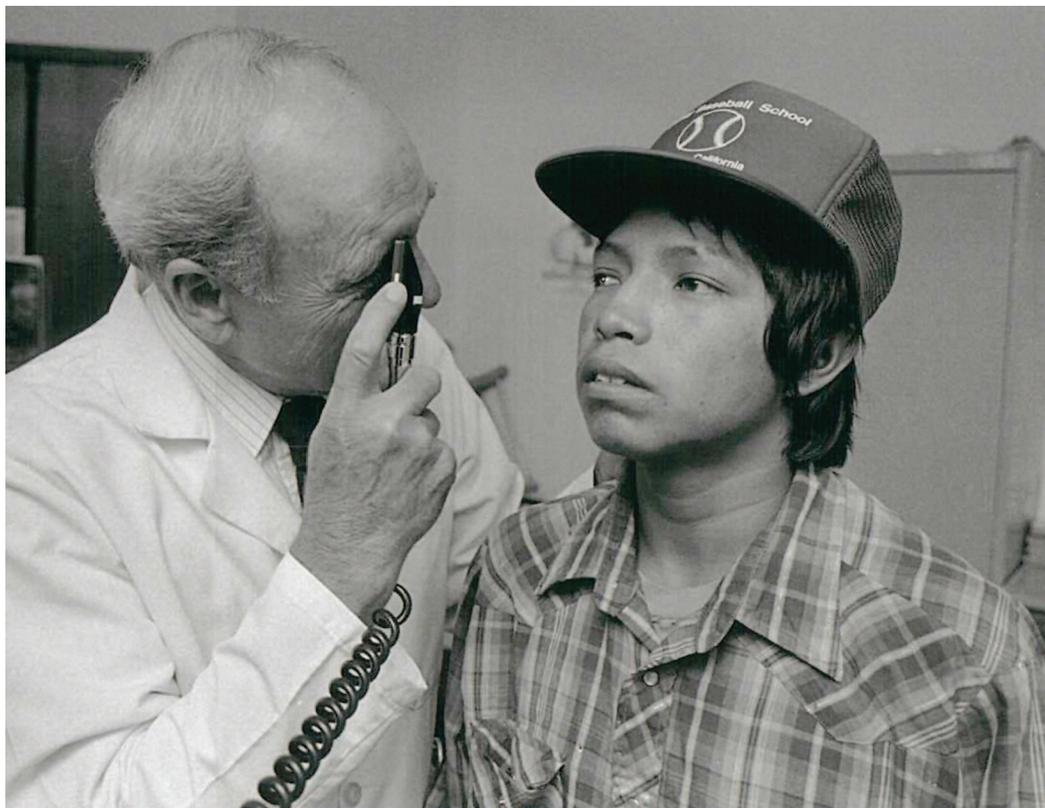
General practitioners and nurses are the initiative's primary audience, because they are usually the first point of contact for patients, and they treat the most patients who may have been exposed to pesticides, says James Roberts, an assistant professor of pediatrics at the Medical University of South

Carolina in Charleston. These caregivers need to know how to handle issues of identifying and treating pesticide and other environmental exposures.

"We have to raise awareness and acknowledge we're not going to ban pesticides tomorrow," says Katherine Kirkland, executive director of the Association of Occupational and Environmental Clinics. "[Pesticides are] going to be out there, and we need to bring practitioners, nurses, physicians, and others into thinking about [them]."

Currently, however, the vast majority of patients are seen by physicians who have no training in occupational or environmental medicine, says NIEHS director Kenneth Olden. "We can't prevent disease unless we deal with the issue of the environment," he says. Much work lies ahead to fill this knowledge gap.

The forum worked to build support for the initiative



**The A-team.** A new initiative seeks to make sure primary health care providers—those most likely to see pesticide poisoning in patients firsthand—are trained to diagnose and treat the effects of pesticide exposures.

Alan Pogue/Migrant Clinicians Network

from stakeholders, create a national vision for environmental health outreach to health care providers, and develop a nationwide network of health care providers committed to incorporating environmental health into primary care education and practice. Specifically, participants developed strategies to help ensure that information on pesticides would be used by caregivers and would infiltrate the medical and nursing community.

Forum participants included representatives from health care provider organizations, credentialing bodies, academia, government agencies, primary care providers, and more. Many pledged to encourage implementation of the initiative by working with their professional associations, decision-making authorities, and practice settings to integrate pesticide-related content into curriculum and practice. For example, several individuals committed to seeking endorsements from national professional associations of the initiative's companion booklets—*National Pesticide Competency Guidelines for Medical & Nursing Education* and *National Pesticide Practice Skills Guidelines for Medical & Nursing Practice*, both published in January 2003 by NEETF.

### Selling the Message

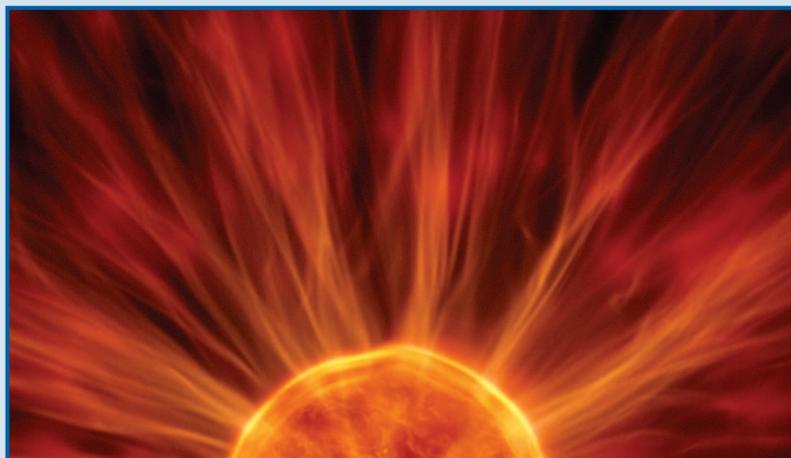
“Ken Olden’s message is a great message: The future of medicine in this country and [other] developed nations is about understanding the interactions between environmental factors, behaviors, and genetics,” says Daniel Goldstein, director of medical toxicology for Monsanto. “And that’s the message that resonates with deans, with public officials, with people who make broader curriculum decisions. If you’re going to [sell the idea of pesticide education], you really need to be selling a much broader program in environmental health. Pesticides can serve as the best-developed model of that.”

Pesticide education alone may not interest caregivers, educators, and other concerned parties in incorporating environmental health into training and practice, Kirkland agrees. “What we need to do is integrate it into a bigger occupational and environmental program.”

“A lot of this stuff will never trickle down unless we change marketing approaches,” adds Amy Liebman, an environmental health specialist with the Migrant Clinician Network. She suggests emulating marketing strategies employed by other industries, such as pharmaceutical companies, which successfully target doctors through free samples, mailings, and other means to educate them about new products and get them to prescribe their drugs.

## Headliners Immune Response

NIEHS-Supported Research



### Inhibiting IKK- $\beta$ and NF- $\kappa$ B Prevents Systemic Inflammation but Increases Local Injury

Chen LW, Egan L, Li ZW, Greten FR, Kagnoff MF, Karin M. 2003. The two faces of IKK and NF- $\kappa$ B inhibition: prevention of systemic inflammation but increased local injury following intestinal ischemia-reperfusion. *Nat Med* 9:575–581.

The transcription factor NF- $\kappa$ B is a major regulator of immune responses stimulated by proinflammatory stimuli such as tumor necrosis factor, viral and bacterial infections, and chemical and physical stressors. Because NF- $\kappa$ B is detected at sites of inflammation and infection, it is thought to play a role in acute and chronic inflammatory disorders such as septic shock and asthma. NF- $\kappa$ B normally resides in the cytoplasm bound by an inhibitory protein known as I $\kappa$ B. Phosphorylation of I $\kappa$ B by I $\kappa$ B kinase (IKK)- $\beta$  releases NF- $\kappa$ B, which then moves into the nucleus. There, it acts in the induction of numerous regulatory genes of the immune system. The products of these genes are proinflammatory factors.

NIEHS grantee Michael Karin of the University of San Diego, California, and colleagues sought to elucidate the role of NF- $\kappa$ B in severe systemic inflammation and multiple organ dysfunction syndrome (MODS). MODS, a serious and often fatal condition, occurs in patients with septic and toxic shock and other systemic inflammatory response syndromes. In MODS, activated neutrophils infiltrate tissues, resulting in the release of proteases, reactive oxygen species, and various cytokines and inflammatory mediators that contribute to tissue injury and failure. NF- $\kappa$ B has been proposed as an important amplifier of this response, but it is unclear whether it is crucial for initiating the inflammatory response.

Using a classic model to induce severe inflammation called gut ischemia–reperfusion, in which the blood supply is cut off to the gastrointestinal tract for 30 minutes and then restored, the team determined that mice whose intestinal cells lacked IKK- $\beta$  did not have the predicted systemic inflammatory response. However, the lack of IKK- $\beta$  caused severe damage to the reperfused intestinal mucosa in these mice because of apoptosis. Therefore, the authors postulate that therapeutically blocking the activity of IKK- $\beta$  in humans would likely block the inflammatory response, preventing MODS. However, this would occur at the cost of severe tissue injury. These results show the dual roles for the NF- $\kappa$ B system in both tissue protection and systemic inflammation.

The authors assert that this study provides unequivocal and direct proof that NF- $\kappa$ B is not just a marker of inflammation, but is the driving force for initiation and spread of acute and systemic inflammation. And they point to a primary role for NF- $\kappa$ B activation in response to physical and chemical stressors in protecting the challenged cells or tissues from apoptosis. Although IKK- $\beta$  and NF- $\kappa$ B inhibitors are likely to be potent anti-inflammatory agents, this study underscores the potential danger of using them during severe inflammatory episodes caused by shock, trauma, and other critical illnesses. —Jerry Phelps

Forum participants generated specific recommendations for education and practice settings and for the development of resources and tools. Examples included pursuing consumer-based promotion of environmental health/pesticides messaging in tandem with caregiver continuing education, initiating discussion and coverage of the issue with leading physician and nursing societies, and creating educational opportunities through credentialing bodies and professional societies that influence providers' continuing education.

Shelley Davis, coexecutive director of the Farmworker Justice Fund, says there are gaps in the data on nationwide pesticide exposures that make addressing related health issues difficult. For example, clinical diagnostic tests are limited, as are efforts to track such exposures on a broader scale. "We really don't have good tools to identify when [exposures and poisonings] occur," says Davis. The health care community should advocate for better data and more accessible diagnostic tests.

"Some places could do a better job of integrating risk reduction into public health programs such as Head Start [which fosters healthy development in low-income children with the ultimate goal of preparing them for school] and other large programs

that are the foundation of public health," says Patricia Butterfield, director of occupational health nursing at the University of Washington School of Nursing, who represented the American Association of Colleges of Nursing. "Sometimes a modest change in the provision of materials can help families make simple and commonsense decisions about risk reduction"—for example, choosing less toxic products or taking off their shoes before going into the home to prevent tracking pesticides in from the outdoors.

Besides working at the grassroots level, health care providers need to function as advocates for environmental health issues on many fronts. "We should also be concerned about the environmental justice and ethical issues related to pesticides and environmental health issues," says Bonnie Rogers, an associate professor of nursing and public health at the University of North Carolina School of Public Health. For example, exposures are worse in inner cities (where more pesticides may be used inside the home to control cockroaches and other vermin) and in migrant farm communities.

#### Following Up

Although the forum succeeded in obtaining commitments from important players—such as key nursing and occupational

health associations—greater commitments need to be secured from pesticide manufacturers, Davis says: "We need to look to industry groups to be responsible stewards of their products." No such commitments were secured at the meeting, but Goldstein says industry generally supports the Pesticides Initiative.

NEETF will conduct a six-month follow-up survey to assess the progress that participants make on their commitments and the short-term goals of the forum. Forum leaders expect full implementation of the initiative will be a long-term national effort. A conference report will be available in the fall of 2003.

As Olden summed, when it comes to educating physicians and other primary health care providers about the environment, the NIEHS and like-minded institutions haven't had the impact they should have had. Full implementation of the Pesticides Initiative will reverse that trend, its promoters contend. —Julie Wakefield

#### For More Information

National Strategies for Health Care Providers: Pesticides Initiative  
<http://www.neetf.org/health/providers/index.shtml>

# ehp

Journal of the National Institute of Environmental Health Sciences

## Required Reading

A semester online subscription provides your students:

- the most current peer-reviewed news and research on the impact of the environment on human health
- 30 years of comprehensive and searchable archives
- perspective articles that put science into context
- article formats that fit your curriculum

At just **\$10 per student**, EHP is the most affordable teaching resource available. Contact us to learn more about incorporating EHP into your students' course materials.

Online: [ehponline.org/student](http://ehponline.org/student)  
 Toll free: 1-866-541-3841



[ehponline.org](http://ehponline.org)

Environmental Health  
P E R S P E C T I V E S

## Environmental Knights of the Roundtable

A key challenge in environmental health is the joining of disparate influences and perspectives to create a unified understanding of issues pertinent to the field. Committed to this quest are the members of the Institute of Medicine Roundtable on Environmental Health Sciences, Research, and Medicine, which draws on the varied expertise of representatives from government agencies, academia, and industry to foster communication on environmental health topics. The Institute of Medicine is part of the National Academies.

Christine Coussens, program officer of the Institute of Medicine Board of Health Sciences Policy and study director of the roundtable, explains that the group, which first met in October 1998, does not intend to dictate solutions. "The purpose is really to generate dialogue among the stakeholder groups and also to discuss a series of mutual concerns. The idea is not to come to a consensus on an issue but rather to inform the debate," she says. The roundtable is sponsored by the NIEHS, the Centers for Disease Control and Prevention, the U.S. Environmental Protection Agency, the American Chemistry Council, and Exxon Mobil Corporation.

This dialogue is invaluable, according to Myron Harrison, senior health advisor for Exxon Mobil Corporation and a roundtable member. "The roundtable is trying to get a better grasp on ways to make progress on environmental health," he explains.

The roundtable does not address single issues, Harrison says, but rather takes a more holistic approach to environmental health and to how the United States as a country and as a culture can make more progress. That progress will come through partnerships and collaboration, he says—not through arguing, regulating, and fighting debates out in court.

The cornerstone of the roundtable's outreach is its series of workshops, interdisciplinary symposia that evolve from discussions held at biannual roundtable meetings. Four major workshops have been held to date. The first was Rebuilding the Unity of Health and the Environment: A New Vision of Environmental Health for the 21st Century, held 20–21 June 2000. Participants at this workshop considered the natural, built, and social environments and how these contribute to good public health. The second workshop, Cancer and the

Environment: Gene–Environment Interactions, was held 16–17 May 2001. This workshop featured information on genetic and environmental factors that are known or suspected to affect cancer incidence. The third workshop, The Role of Environmental Toxicants in Premature Birth, was held 2–3 October 2001. It included presentations on the current understanding of premature birth, potential environmental influences on the length of pregnancy, and related knowledge gaps and research needs. The most recent workshop, Environmental Health

Indicators: Bridging the Chasm of Public Health and the Environment, was held 10–11 April 2002. This workshop focused on the need to mesh public health indicators with environmental exposure data.

The next workshop, scheduled for 16 October 2003 and titled Source Water to Drinking Water, will look at critical issues in protecting the U.S. water supply.

These workshops have stimulated a broader understanding of the topics they covered and have created a foundation for further work, according to roundtable members. Samuel Wilson, NIEHS deputy director and a roundtable member, indicates that the first workshop yielded several beneficial developments, especially with regard to increased recognition of how the built environment affects human health. "That

[concept] was not very well articulated or understood around the membership of the roundtable prior to the roundtable meetings. I think now, after a number of roundtable discussions and the first symposium that the roundtable sponsored, the idea has been reinforced," he says.

Further reinforcement has occurred through related regional workshops in Atlanta and Pittsburgh, and this reinforcement may prompt more focused research. "The NIEHS and other agencies have actually started to consider a research agenda around this topic," says Wilson. "I think a lot of that momentum came from the initial work of the roundtable."

Regional workshops are a continuing activity of the roundtable. "In order to be healthy individuals, we need to have . . . a healthy natural, a healthy built, and a healthy social environment," says Coussens. Coussens also says the roundtable is looking at ways to ensure good environmental health on a global scale—a topic for which industry is an important partner—and methods for increasing outreach to health professionals. —Julia R. Barrett

