

## Falk Lecture Gives Overview of Breast Cancer

Although breast cancer still represents one-third of all cases of cancer in women and affects one out of nine women in the United States, the patterns of causation and some means of preventing breast cancer are becoming clearer, according to Barbara S. Hulka, who delivered the Hans L. Falk Memorial Lecture for 1994, on December 12 at the NIEHS in Research Triangle Park, North Carolina. Hulka was the tenth lecturer in the annual series, named for NIEHS's first scientific director.

In a meticulous overview of recent studies, the internationally recognized epidemiologist discussed the many risk factors associated with breast cancer, some familiar from mass media reports and others less well known. Hulka then reviewed possible strategies for preventing the disease, even before the benefits of mammography and early detection come into play.

Rates of breast cancer increase dramatically with age, Hulka pointed out, with only 20% occurring before age 50, and the rates are increased in women with family members who have had the disease, especially when those family members are young women. Geography makes a marked difference in incidence, with lowest rates in Asia and Africa and highest rates in several Western nations such as the United Kingdom and the United States. Women with higher educational and professional levels have higher rates, perhaps because of later childbearing patterns among these women. Early childbearing and longer duration of breastfeeding decrease rates, as do later commencement of menstruation and earlier menopause.

Other risk factors include alcohol consumption, cigarette smoking, dietary fat, oral contraception use among women diagnosed before age 45, and estrogen replacement therapy. Controversial suspected risk factors include exposures such as organochlorine pesticides (DDT/DDE and PCBs), electromagnetic fields, by-products of charbroiling food (heterocyclic amines), phytoestrogens from soy products, and breast implants.

With such an array of established and suspected risks, at least some of the risks also provide a means of prevention; for example, simple lifestyle choices. Women have control of their alcohol consumption

and smoking habits. Exercise at all ages and weight reduction in post-menopausal women are likely to be beneficial, and for new mothers, breastfeeding for six months to a year or more has potential benefits, Hulka pointed out.

Other preventive strategies being studied include a clinical trial of the drug tamoxifen and hormone replacement therapy. Clinical trials of dietary modification will include calorie and fat reduction and increased consumption of fruits, vegetables, and grains among some 60,000 women volunteers. Other studies are looking at the role of micronutrients including retinoids and carotenoids and antioxidants in decreasing risk.



Barbara S. Hulka

## Environmental Awareness at NIEHS

Although the primary mission of the NIEHS is to investigate the effects of the environment on human health, the institute has not forgotten the health of its own local environment. This

May marked the third anniversary of the establishment of the institute's Environmental Awareness Advisory Committee (EAAC), an employee-based organization created to respond to specific issues and practices that have a significant impact on the NIEHS and its surroundings.

"The committee was originally formed to deal with a number of energy-saving and other environmental issues arising from suggestion programs and other formats," explains Associate Director for Management Charles Leasure, Jr. "Before long, the program included a much wider range of concerns, such as paper reduction, safe plastics, and the responsible use of pesticides and herbicides. As its mission broadened, so did the number of people who were interested in joining the committee, and so we opened it up to any employee who is willing to actively participate in a project."

One of the committee's most visible enterprises is a multimaterial recycling program begun in January 1993. The program targets many of the institute's solid wastes, including paper, newspaper, cardboard, magazines, catalogs, aluminum foil and cans, beverage glass, plastics, and

steel cans. The waste is picked up by a private contractor and eventually sold to paper mills and other manufacturers for reprocessing. Over 392,000 pounds of solid waste have been recycled in the 18 months since the program started.

Another successful approach to NIEHS's solid waste problem is a program to reduce the flow of incoming mail. Committee Secretary Bill Willis has been working with vendor representatives to eliminate the names of employees who are no longer with the institute from their mailing lists. "We have prevented hundreds of unwanted catalogs from being delivered to the institute," says Willis. "This program reduces our need to get rid of these items while also eliminating the companies' need to print them, the end result being an overall reduction in paper use."

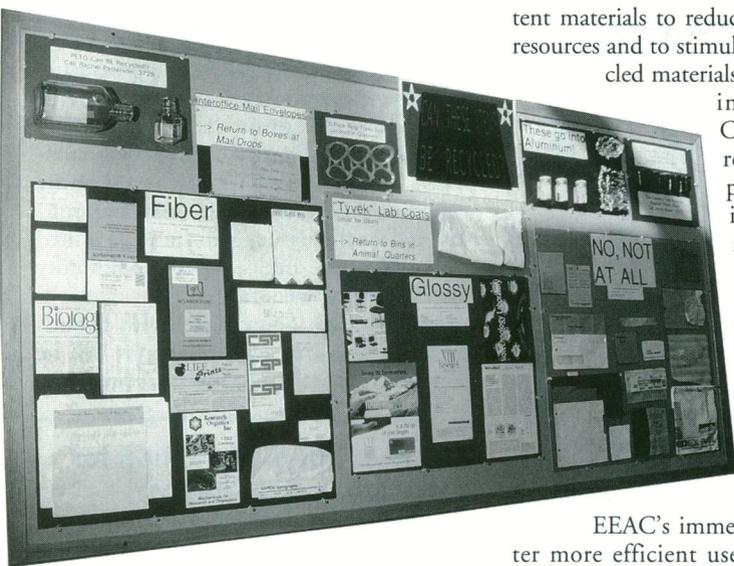
The EAAC has also begun an aggressive program to reduce energy consumption. Many of the institute's incandescent lights have been replaced with more energy-efficient fluorescent bulbs, and variable-speed motors are replacing the less efficient single-speed devices. Facilities engineering personnel are equipping conference rooms and laboratories with light timers and automatic sensors that can be programmed to turn off unneeded lighting. A "lights out" campaign has been started, complete with promotional stickers to remind employees to take responsibility for turning off their own lights. Committee members are also working on a plan to reduce the amount of solar heat in the main building during summer months.



Color my world. EAAC outreach uses coloring books to teach children about pollution.

Although much of its focus has been on human activities, the committee's agenda has expanded to include wildlife around the NIEHS campus. NIEHS Director Kenneth Olden recognizes the importance of maximizing the biodiversity of flora and fauna that inhabit the NIEHS campus. "Research has shown that more complex ecosystems are better able to withstand the stresses of change than are simple ones," says Olden. "We should strive to provide a place for our local species that are threatened by decreased habitat and food supplies."

To achieve this goal, the EAAC has enlisted the help of students from the Duke



**What goes where?** The EAAC information board tells employees what materials can be recycled.

University Environmental Graduate Program. The students, as part of their classroom studies, have characterized the ecosystem of the NIEHS campus, providing a better understanding of the plant and animal life on the site. Their final report details three separate guidance plans that could be followed to achieve various management levels for the institute's 509 acres.

The management plan favored by EEAC would create a more natural appearance on the institute grounds. The plan would prohibit mowing and landscaping activities around trees, allow for an unmown buffer zone near the institute lake, and provide for the planting of trees and shrubs whose bloom and fruit periods would be distributed throughout the year.

In keeping with the educational outreach program being pursued by NIEHS, EEAC is interfacing with Project Wild, a nationally recognized, interdisciplinary program that integrates wildlife principles into environmental and conservation efforts. Project Wild stresses the importance of wildlife as an environmental health indicator and as a measure of the quality of life in general. This fall, NIEHS will serve as host for Project Wild workshops on terrestrial and aquatic wildlife.

According to EAAC Chair Robert Chapin, successful implementation of these programs should pave the way for other ventures. "We will continue to push for a reduction in our use of natural resources, more efficient strategies for necessary resource use, and a more environmentally responsible management of the institute grounds," says Chapin.

Some of the new proposals are extensions of current programs. The committee is recommending that NIEHS significantly increase its procurement of recycled-con-

tent materials to reduce pressure on virgin resources and to stimulate markets for recycled materials. "If you're not buying recycled," says Chapin, "you're not recycling." The proposal also calls for increased use of environmentally friendly products, such as nontoxic inks and low-bleach paper, whose manufacturing generates less harmful chlorination by-products like PCBs.

One of the EEAC's immediate goals is to foster more efficient use of available transportation to and from the institute. "Of all our employees, fewer than 10 use alternatives to private automobiles to get to work," says Chapin. "Since automobile exhaust is the major source of air pollution in the Research Triangle area, promoting more efficient means of local transport would have immediate benefits."

Some of the alternatives being discussed by committee members include promoting the institute's new carpool program, encouraging employee participation in mass transit and shuttle pick-up at bus drop-off points, and working with local planners to build public bikeways.

Chapin says he's learned a valuable lesson from his committee's relentless commitment to environmental goals. "If you unleash the creative power of the employees, a lot of great things are going to happen. Our efforts clearly demonstrate that management and employees can work together to bring about beneficial changes in areas where they are needed."

### NTP Announces Bioassay Results

The National Toxicology Program has presented six more technical reports in its ongoing series of toxicology and carcinogenesis studies. All six reports were approved by the NTP's Board of Scientific Counselors' Technical Reports Subcommittee in a public review held November 29 at NIEHS. Each report involves a series of long-term studies in which male and female rats and mice were given a range of doses of test chemical followed by extensive histopathologic examination.

*Nickel oxide, nickel sulfate, and nickel subsulfide.* Three separate studies were performed to evaluate and compare the toxicity and carcinogenicity of three nickel compounds prominent in nickel mining and

refining. These studies involved inhalation exposure to atmospheres containing particles of nickel oxide, nickel sulfate hexahydrate, or nickel subsulfide. The three nickel compounds all caused chronic lung inflammation in male and female rats and mice, but the carcinogenic responses varied.

Nickel subsulfide exhibited clear evidence of carcinogenic activity in male and female rats, but not in mice, based on the occurrence of neoplasms in the lung and adrenal gland. Nickel oxide also caused neoplasms at these two sites in male and female rats and also showed equivocal evidence of carcinogenicity in female mice based on a marginal increase in lung tumors. In contrast, the water-soluble nickel sulfate hexahydrate exhibited no evidence of carcinogenic activity in either rats or mice.

*Isobutyl nitrite.* Isobutyl nitrite is used in fragrances and is also abused as a euphoric. It was nominated for study to investigate a possible association with the higher incidence of Kaposi's sarcoma among male homosexual AIDS patients (see Haverkos et al., *EHP* 102: 858-861). When animals were exposed to this chemical via inhalation exposure, male and female rats exhibited clear evidence of carcinogenic activity, and male and female mice exhibited some evidence of carcinogenicity, based on increased incidences of lung neoplasms in all four sex/species groups.

*Triethanolamine.* Triethanolamine is used as a surfactant in a wide variety of industrial and household products, including cosmetics and detergents. When administered by dermal application to rodents, triethanolamine was associated with increased incidences of liver tumors in female mice. Marginal increases in the incidences of liver tumors in male mice and kidney tumors in male rats were judged equivocal.

*2,2-Bis(bromomethyl)-1,3-propanediol.* 2,2-Bis(bromomethyl)-1,3-propanediol is a brominated fire retardant (trade name FR-1138) used to treat molded plastics and polyurethane foam. When given in feed, this chemical was clearly carcinogenic to a variety of organs in male and female rats and mice, including at least 14 distinct tissue sites in male rats.

### Environmental Justice Grantee Orientation Meeting

On 8 December 1994, new grantees in the NIEHS environmental justice research grant program met at the institute for an orientation session. The primary objective of this grant program is to bridge the communication gap among members of communities affected by environmental pollu-