

# SENTINEL

The Center for Environmental Health and Susceptibility  
at the University of North Carolina, Chapel Hill

Fall 2005, Issue #4



## CEHS launches Obesity Research Core

### OBESITY INCREASES THE RISK FOR SEVERAL SERIOUS HEALTH CONDITIONS

The Center for Environmental Health and Susceptibility (CEHS) at the UNC-Chapel Hill School of Public Health is one of 22 centers funded by the National Institute of Environmental Health Sciences to:

- improve our understanding of the environmental and genetic determinants of disease in different populations;
- enhance interdisciplinary research in order to further our knowledge about how toxic chemicals affect humans; and
- disseminate existing knowledge to help reduce the burden of environmentally related disease.

For more information on the research taking place at the UNC-Chapel Hill CEHS, visit our website at [www.sph.unc.edu/cehs/](http://www.sph.unc.edu/cehs/)

OBESITY HAS REACHED EPIDEMIC proportions: two-thirds of all American adults are overweight or obese — nearly double the number 20 years ago. Similarly, one in five U.S. children are overweight, making this a serious public health problem for Americans of all ages, races, and genders.

The health, social, and economic costs of this epidemic are significant. Obesity increases the risk for several serious health conditions, including type 2 diabetes, heart disease, stroke, high blood pressure, and some types of cancer, and adds \$93 billion per year to the cost of health care in our country. Genetics, as well as a range of changes to our social, economic, and physical, or “built,” environment (increasing reliance on cars rather than walking, lack of sidewalks and recreation facilities, and the convenience of fast foods and vending machines, for instance) are important contributors to this alarming trend.

To further our understanding of the links between obesity and

the physical environment, the UNC-Chapel Hill Center for Environmental Health and Susceptibility has added an Obesity Research Core, headed by Dr. Barry Popkin, professor of nutrition at the UNC School



of Public Health. The Core fosters dialogue and research among scientists and practitioners from a wide range of disciplines who are engaged in exploring interactions between obesity and the environment.

“Obesity is clearly a public health crisis, but stemming the problem is difficult because the causes are so complex,” Popkin says. “Through the Obesity

*continued on page 3* ▶▶



*Dr. James Swenberg, Director,  
UNC-Chapel Hill CEHS*

AS UNC'S CENTER FOR Environmental Health and Susceptibility enters its fifth year, several exciting happenings are moving us forward in our mission to foster innovative, interdisciplinary research.

The new building provides a perfect environment to facilitate interdisciplinary engagement.

- The UNC School of Public Health's new Michael Hooker Research Center, a state-of-the-art facility, now houses wet labs for the Departments of Environmental Sciences and Engineering, Nutrition, and Epidemiology, including the labs of many CEHS researchers. The new building, with its multidisciplinary occupants and a wealth of meeting spaces, provides a perfect environment to facilitate interdisciplinary engagement.
- The CEHS faculty has submitted several major interdisciplinary

research proposals. The largest is our proposal to the National Institute of Environmental Health Sciences to continue our 14-year partnership in the Superfund Basic Research Program. In my opinion, this proposal, which features six diverse, yet highly interwoven research projects, is the strongest we have ever submitted to the NIEHS for this program.

- Genetic Susceptibility Research Core Director William Kaufmann is collaborating with three other CEHS members on a multidisciplinary project on sunlight-induced melanoma. They are also teaming with UNC oncologists, dermatologists, pharmacologists, computer scientists, and applied mathematicians to develop a systems biology approach to understanding this environmentally linked cancer.
- The CEHS has added several outstanding scientists adept at bridging disciplines. Among them: Dr. Daniel Pomp, a new UNC professor in the Departments of Nutrition, Cell and Molecular Physiology, and the Carolina Center for Genome Sciences, has joined

our Transomics Research Core. Dr. Pomp is internationally known for his work on the genetics of obesity in mice. He and Core Director David Threadgill have a grant to study the genetic links between cancer and obesity and a proposal to examine the genetics that contribute to voluntary exercise. Dr. Pomp will provide a strong link between the CEHS Transomics Research Core and the new Obesity Research Core, highlighted in this newsletter.

- The CEHS Transomics Research Core's Ivan Rusyn and David Threadgill have been funded to examine the relationship between the progression of liver disease and exposure to alcohol. This highly integrative systems biology approach will lead to a better understanding of the mechanisms of liver toxicity and genetic links that correlate to susceptibility or resistance to the disease.

In addition, with the start of the new academic year, the CEHS returned to an active seminar schedule. (See the CEHS website for details.)

James Swenberg,  
*Director, CEHS*

## CEHS launches Obesity Research Core *continued from front page*

Research Core, our goal is to provide a collaborative environment that gets people from different disciplines talking with each other. The Core pulls together scientists from 25 departments and programs across the UNC campus who study cancer, population trends, the environment, nutrition, urban planning, genetics, and other disciplines to study the obesity problem and define effective interventions for prevention and treatment.”

UNC has the largest cluster of scholars in the world who focus their research on the built environment and its relationships to dietary behavior, physical activity, and obesity throughout the life cycle. Creation of the Obesity Research Core was facilitated by a \$1.7 million grant from the National Institutes of Health (NIH) to focus on obesity treatment and prevention.



“The escalating prevalence of obesity and its consequences is a serious and unresolved challenge,” Popkin notes. “Obesity prevention and treatment have had limited success to date, in part because interventions have focused on isolated factors and

adopted a ‘one size fits all’ approach. At the CEHS, we feel that obesity must be addressed within a complex, individualized system of biological and environmental factors using an intensive interdisciplinary approach.”

With support from several NIH grants, CEHS

“The escalating prevalence of obesity and its consequences is a serious and unresolved challenge...”

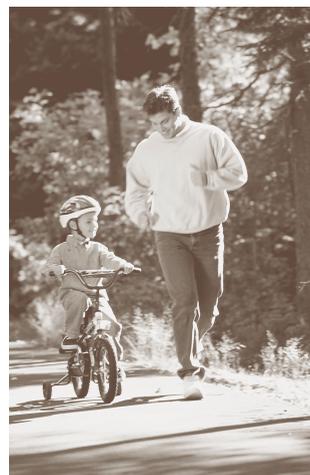
researchers are currently engaged in a variety of novel studies to explore how the physical environment affects diet, activity, and obesity for people of all ages, as well as potential remedies to help turn back this alarming trend. Studies include:

- The impact of the built environment on physical activity and obesity patterns in adolescents and young adults, particularly in underserved communities.
- Understanding changes in physical activity, nutrition,



and obesity among postpartum women, and how environmental factors such as proximity to fast food, supermarkets, and recreational facilities affect these changes.

- Assessing the feasibility of two approaches to increase children’s travel to school by foot or bicycle, rather than by car or bus.



In addition to facilitating research, the Obesity Research Core also trains and nurtures graduate students and young faculty as they launch their careers in this important area.

For more information on the CEHS Obesity Research Core, visit <http://www.sph.unc.edu/cehs/research/obesity.htm>.

# Behind the Scenes: Epidemiologist Marilie Gammon links environment to breast, esophageal cancers



IN 1993, CONGRESS MANDATED a study to identify environmental risk factors for breast cancer among women on Long Island, New York. Two years later, Dr. Marilie Gammon, who was at that time an epidemiologist at Columbia University, was awarded funding from the National Cancer Institute and the National Institute of Environmental Health Sciences for the Long Island Breast Cancer Study Project. She has continued as principal investigator even after joining the UNC-Chapel Hill faculty in 1999. In 2002, she was named deputy director of the CEHS. Dr. Gammon now collaborates with other CEHS researchers on several studies using data collected on Long Island.

“Breast cancer incidence rates are very high in the Northeast in general, and particularly up and down the I-95 corridor,” Gammon notes. “Before this large-scale project, the environmental links to breast cancer had never been systematically studied.”

Using data collected from thousands of Long Island women, Gammon and her team have been studying a variety of potential environmental links, including DDT, a pesticide that was sprayed for mosquitoes and Dutch Elm disease, and polycyclic aromatic hydrocarbons (PAHs), combustion byproducts commonly found in cigarette smoke, car and truck

exhaust and even on barbeque grills. The Long Island study did not find a link between breast cancer and exposure to DDT, but it did discover an increased risk among women who had detectable PAH adducts in their DNA.



“There are so many aspects of breast cancer that we don’t know a lot about, so we’ve been collecting information on many variables to understand the traditional environmental risk factors and identify other environmental factors that might not immediately be apparent,” Gammon explains.

For instance, in a study reported in the *Journal of the American Medical Association* last year, Gammon’s team found that daily aspirin use reduces a woman’s risk of developing breast cancer. They also found no links between electric blanket use or living near electric utility poles and breast cancer. And a study of diet found a significant reduction in risk associated with high daily intake of fruits and vegetables.

In August, Gammon’s team published, in the *American Journal of Epidemiology*, the results of a groundbreaking study, which showed that gaining more than 24 pounds after age 50 increases a woman’s risk of breast cancer by 62 percent, regardless

of what she weighed at age 50. Women who gained more than 33 pounds since age 20 had a 60 percent increased risk of postmenopausal breast cancer compared with women who had not gained weight.

Gammon and her collaborators have received funds to examine whether DDT, PAHs, and other environmental factors such as diet and alternative therapies are associated with breast cancer survival. She is also studying links between the environment and esophageal cancer, particularly esophageal adenocarcinomas, which have increased dramatically in the U.S. over the past three decades. She collaborated on a major national study that identified smoking, poor diet, and obesity as major risk factors for this type of cancer.

“Obesity is clearly an important risk factor for several types of cancer,” says Gammon, who works closely with colleagues in the CEHS Obesity Core.



“Obesity rates in the U.S. and Western countries have been climbing, and we believe that the built environment has a lot to do with that.”

For more information about the Long Island Breast Cancer Study and its findings, visit <http://epi.grants.cancer.gov/LIBCSP/>.

# New workshop gives teachers the skinny on obesity

CHILDHOOD OBESITY HAS reached epidemic proportions: one in five American children is overweight. Type 2 diabetes in children is on the rise. What can North Carolina teachers and schools do to help students lead healthier lives?

The CEHS Community Outreach and Education Program

(COEP) staff now offers *The Skinny on the Science of Obesity*, a workshop for K–12 teachers interested in learning about the global obesity epidemic — and what schools can do about it.

The 4-hour workshop features engaging classroom activities and discussions about emerging scientific research at UNC-Chapel Hill. By work-



shop's end, participants have a greater understanding of the causes and consequences of obesity and practical ideas for connecting health and wellness education to students' lives. Teachers also receive lesson plans and materials to carry out the activities learned in the workshop.

Already, more than 100 educators have participated in free workshops held at the Morehead Planetarium and Science Center in Chapel Hill, the Museum of Life and Science in Durham, and the Poe Center in Cary, as well as in shorter presentations at the N.C. Science Teachers Association and the Healthful Living Institute of the N.C.

Departments of Public Instruction and Health and Human Services. Michele La Merrill, a CEHS doctoral student in toxicology, co-facilitates this workshop with COEP staff.

“There’s a lot of interest in this subject, because teachers are seeing obese students, from kindergarten all the way up through high school, and they are very concerned,” said La Merrill, who is doing research on obesity for her dissertation. “This workshop gives teachers the tools to educate students and parents about the consequences and prevention of obesity and related health problems, helping to motivate behavioral changes such as improved physical activity and nutrition.”

*The Skinny on the Science of Obesity* is available free to North Carolina educators and state officials. For more information, contact Kathleen Gray at 966-9799 or [kgray@unc.edu](mailto:kgray@unc.edu).

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## Breast cancer workshop still available

THE CEHS COMMUNITY Outreach and Education Program (COEP) continues to offer *Breast Cancer, Genes and the Environment* across North Carolina. This well-received, interactive workshop — developed in partnership with the North Carolina Breast Cancer Coalition and the University of Cincinnati through a grant from the National Institute of

Environmental Health Sciences — helps participants understand the complex risk factors for breast cancer, in particular environmental and genetic factors. It also addresses opportunities for risk reduction and some of the issues that might affect a woman’s decision to be tested for a genetic predisposition to breast cancer.



We continue to update this workshop regularly based on the latest scientific knowledge. If you are interested in bringing this workshop to your community or organization, contact Kathleen Gray at 966-9799 or [kgray@unc.edu](mailto:kgray@unc.edu).

Workshop materials are also available at <http://www.sph.unc.edu/cehs/outreach/elsi.htm>.

# CEHS loses leader, friend

DR. FRANCES LYNN, DIRECTOR of the UNC-Chapel Hill CEHS Community Outreach and Education Program, passed away in January 2005 after a valiant battle with cancer. A pioneer in academia and environmental advocacy and outreach, Dr. Lynn directed UNC's Environmental Resource Program, which she founded in 1985. A faculty member in the UNC School of Public Health, she also co-directed the Outreach Core of the Superfund Basic Research Program and served as associate director for outreach and public service of the Carolina Environmental

Program. Dr. Lynn is greatly missed by her friends, colleagues, students, and the many people across the state and country whom she helped to understand and address pressing environmental issues.



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