The Ribbon

BCERF

Volume 13 • Number 3 • Summer 2008

A Newsletter of the Cornell University Program on Breast Cancer and Environmental Risk Factors (BCERF)

New York State Department of Health • Center for Environmental Health

Approach for Responding to Cancer and Environmental Concerns

Interview with Elizabeth Lewis-Michl, Ph.D.

Community Exposure Research Section
Bureau of Environmental and Occupational Epidemiology,
Center for Environmental Health, NYS Department of Health

We at BCERF receive many questions regarding "cancer clusters." The term seems to carry various meanings, among the public, the media, epidemiologists, and others. At times, it is used to refer to the perception of an excess of cancer in a certain time and place, but the situation may not have been formally evaluated. Epidemiologists reserve the term for when a group of cancer cases has been statistically established to be in excess of the expected rate. How do you define cancer cluster?

Dr. Elizabeth Lewis-Michl: Detecting and responding to elevations of disease rates above expected rates, in space, time, or among specific groups of people, is a central focus of epidemiology, but the term "cluster" is rarely seen in an epidemiology textbook. In my experience, the term "cluster" is often used when there is also an assumption of a link between cause and effect. So I avoid using the term.

When we are asked to look into perceived excesses of cancer in space or time, we are quite limited in the conclusions we can draw using available data and traditional statistical tests. My program responds to concerns about cancer related to potential environmental exposures, and the lack of information about past exposures in most situations creates even greater challenges for responding to people's concerns.

We attempt to avoid the confusion associated with the term "cluster." Rather, in situations where we see elevated cancer incidence, we describe our methods, the data used, the statistical tests, and conclusions as precisely as possible, to help put the findings in the context of the limitations of the data and methods. Epidemiological studies only very rarely can link cause and effect, and the types of data reviews we often conduct, assessing whether cancer elevations are evident among the people diagnosed while living in a specific place, and over a specific time period, are unable to link cause and effect.

What are the criteria that the Center for Environmental Health (CEH) uses to determine whether to investigate a potential excess of cancer in a particular place?

L-M: We developed a flow chart (see page 2) to summarize our step-wise approach, which includes consideration primarily of health outcome and exposure characteristics (second box, then third box), but also of data quality and study feasibility issues (third box). When a concern is first brought to us in a letter, phone call, e-mail, or at a public event, the first step is critical and may include several conversations with an individual or a series of meetings with the community. We have to make sure we understand the concern, and

continued on page 2

index

we often need to gather additional information to respond. Through this process of information sharing, the concern is very often addressed, and there is no need to move forward with a request for an investigation.

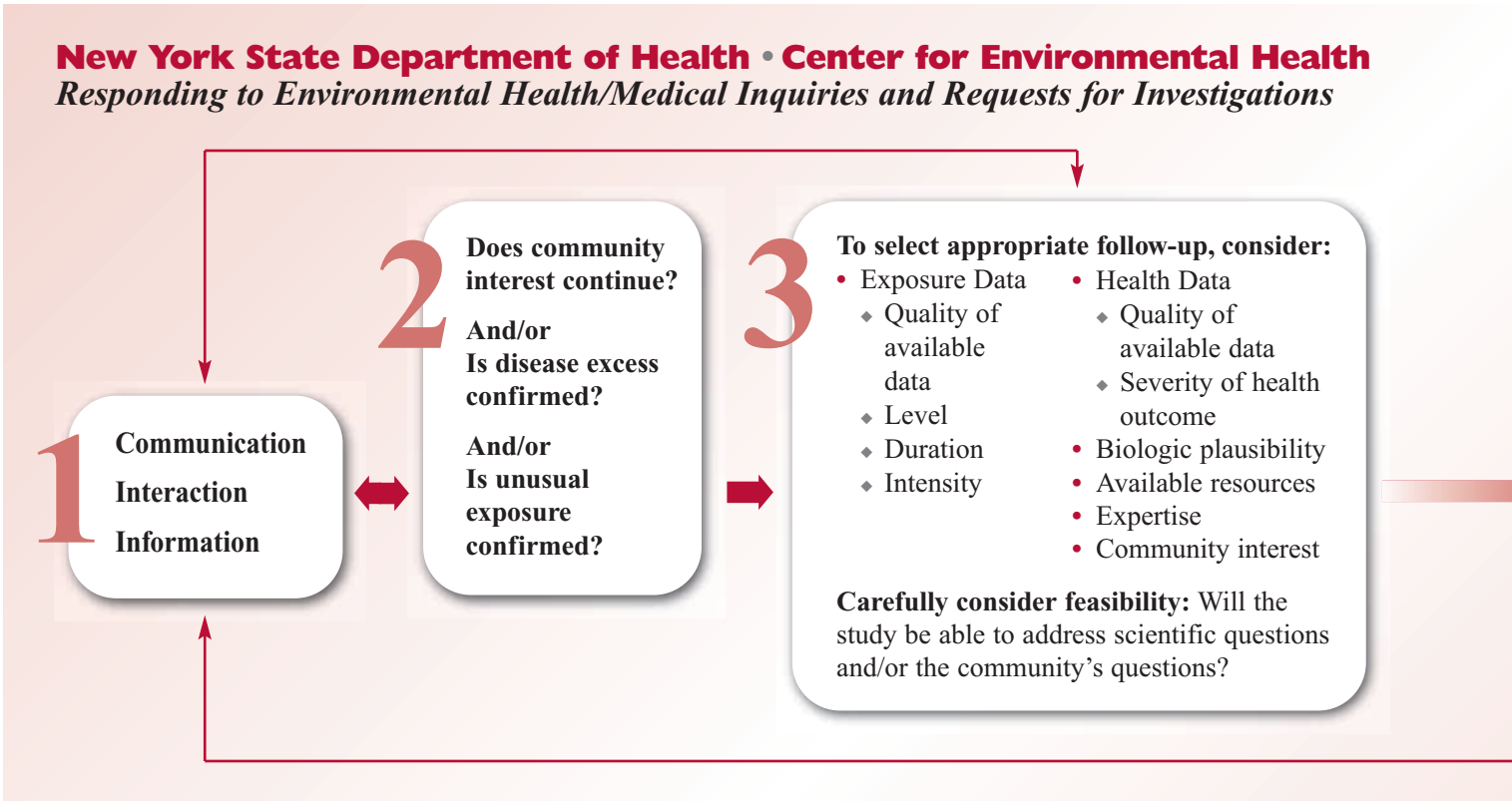
In other cases, if available data confirm an unusual pattern or clearly elevated level of health outcomes, or if there is information suggesting an unusual exposure, we move to the third box. We gather additional information, if possible, and continue to interact with interested individuals, community groups, and stakeholders as we consider the severity of the health and/or exposure problems, the quality of available data, and the likelihood that we have data, methods, and resources for addressing scientific questions and/or answering the community's questions.

The fourth box describes a spectrum of options, including no further action or requesting more information from the community. The fourth box names a few types of follow-up investigations that may be appropriate. We are most often able to follow up with health statistics reviews, which use high quality, statewide comprehensive data available from birth certificates, the NYS Congenital Malformations Registry and the NYS Cancer Registry to see if these outcomes are occurring at a higher, lower, or the same level in the community of concern as in the general NYS population.

How many requests for investigations does the New York State Department of Health (NYS DOH) receive, and how many are pursued? Aside from reviewing requests from the public, how else does NYS DOH determine what situations may require evaluation?

L-M: Cancer concerns are handled by the Health Department's Cancer Surveillance Program most often, with the CEH handling a subset of these concerns that are more specifically focused on environmental issues. Similarly, most cancer incidence investigations are conducted by the Cancer Surveillance Program, with the CEH conducting some of the more in-depth and smaller area studies involving well-defined exposures. The Health Department receives inquiries about cancer concerns through many programs, totaling to at least 100 per year. The number of inquiries that then lead to specific requests, and then to the conduct of cancer studies is approximately 4-5 per year in recent years. Since 1981, the Health Department has conducted more than 350 cancer-incidence investigations.

We move through the decision-making process on the flow chart for determining appropriate follow-up as part of our routine program activities if an unusual exposure has been documented. In other words, we do not wait for a request from the community if we are already aware of a documented, unusual exposure for which follow-up may be warranted and feasible. We learn of such exposures from sampling investigations conducted routinely by our agency or other agencies. For example, we are currently following up on cancer, low birth weight and birth defects in populations at several sites in NYS with documented exposures to volatile organic compounds (VOCs). This is a multi-site health statistics review (fourth box).



In 1990, the Centers for Disease Control and Prevention (CDC) issued "Guidelines for Investigating Clusters of Health Events," providing state health departments the framework of a four-stage process for responding to clusters appropriately and efficiently. A monograph published last year, "An Update on Cancer Cluster Activities at the CDC" (reference below) says that "[the Guidelines] retain their original usefulness and validity," while offering the 2007 article as "an addendum for use with the original document." Does the NYS DOH use the CDC Guidelines, and what is the current relationship between DOH cancer-cluster-related activities and those of the CDC?

L-M: While we did not use the CDC Guidelines specifically when we developed the CEH flow chart, the CDC Guidelines describe a process that matches ours in general concepts and many details. The CDC's four general stages are (1) Initial Contact & Response; (2) Assessment, which emphasizes determining, using existing data, whether an excess has actually occurred and whether the excess can be linked to some exposure; (3) Feasibility study; and (4) Conduct an epidemiological study. The CEH works routinely with the CDC via the Agency for Toxic Substances and Disease Registry (ATSDR), our federal partner for health outcome investigations. Our partner here in NYS DOH, the Cancer Surveillance Program, is in routine contact with the CDC programs that respond to cancer inquiries.

4

Spectrum of options:
- No further action
- Ongoing communication
- Request more information from community

Methods:
- Case series review
- Biological monitoring
- Health statistics review
- Multi-site health statistics review
- Case-control interview study
- Cohort follow-up

What type of public involvement or public education is typically involved in an investigation?

L-M: CEH staff work closely with communities and stakeholder groups when such groups come together and request our assistance to address health outcome and environmental issues. Public availability sessions and meetings and other communication tools are used depending on the level of community interest. In some situations, where there is less community interest, CEH may complete a study with very little community input. Ideally, we like to have at least some opportunity for communication with an affected community so that when an investigation is completed, people are already aware of the strengths, limitations, and possible outcomes from such studies.

At what point in an investigation do possible environmental or occupational exposures come into play?

L-M: As the flow chart shows, exposure issues, along with evidence for a disease elevation, are foremost among the criteria we use when determining appropriate follow-up. We seek information about potential exposures and exposure data from the beginning to understand the nature of the issue. We also have to determine if there are environmental data available, or that could be gathered, of sufficient quality to make an environmental epidemiological follow-up investigation feasible.

There are several methodological issues that cancer cluster analysis has traditionally not been well equipped to deal with, such as the long latency period of cancer, the multitude of possible exposures, transient populations, and low numbers of cases. Do you see improvements in addressing these challenges?

L-M: For the surveillance or incidence studies conducted for specific geographic areas, the typical studies we do, there is no easy solution for these problems. For resource-intensive studies, more likely to be conducted at medical and academic research centers, there are expanding options for improving cancer studies. There is a growing body of knowledge about biological markers of genetic damage that may be associated with environmental exposures that occurred in the past. If such biological markers can be improved to become more chemical, exposure, or time-frame specific, our methods for studying possible causes of cancer will benefit. Similarly, as scientists learn more about markers of susceptibility for certain cancer types, studies can take account of differences among individuals and better detect the effects of any environmental exposures.

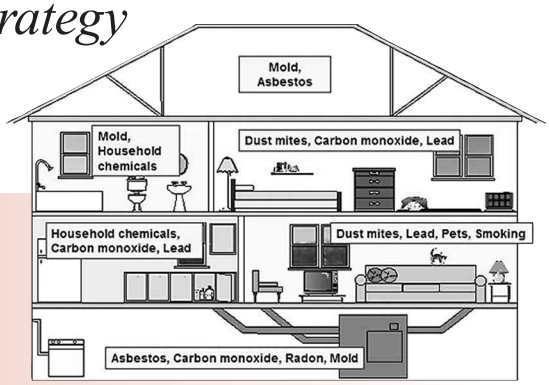
Many investigations do not yield the explanations or answers that concerned people – who justifiably feel that there is too much cancer around them – are anxious to have.

continued on back cover

Spring Regional Cancer and Environment Forum in Rochester

- *New approaches to understanding and decreasing exposures to endocrine-disrupting chemicals*
- *The prevention of weight gain as a strategy to decrease breast cancer risk*
- *The Rochester Healthy Home*

The Breast Cancer Coalition of Rochester hosted a very full house on May 29, 2008, when BCERF brought its twice-yearly Forum there. The 70 participants (the maximum number we could accommodate) heard and participated in four presentations by BCERF and University of Rochester faculty.



Home Health Hazards diagram from the Rochester Healthy Home web site

Prevention of Weight Gain as a Strategy to Decrease Breast Cancer Risk

Dr. Barbour Warren, Research Associate with BCERF, shared the scientific rationale for, and the design of, the BCERF project on obesity and breast cancer risk. Key characteristics of the project include:

- its preventive medicine approach (eliminating disease to decrease both mortality and morbidity),
- addressing breast cancer risk by preventing weight gain and physical inactivity,
- environmental change linked to eating and activity, and
- participants making daily, small, manageable changes.

Dr. Warren described why weight gain and obesity are good targets for a breast cancer risk reduction program for a wide range of reasons, including the extent of breast cancer risk associated with obesity, that the size of risk increases with weight gain and body mass index, and that they are relatively easily modified risk factors. Likewise, physical activity is an appropriate intervention due to its relationship with breast cancer risk, the fact that further decrease in risk is found with successively increased activity, and this risk factor's modifiability. Epidemiologists see risk reduction effects of physical activity beyond those linked to weight loss.

Dr. Warren gave a fascinating review of how contemporary western women's typical pattern of "calories in" versus "calories out" is in stark contrast to how we evolved in humankind's historical environment, resulting in a mismatch of genes and environment. Our ability to efficiently store energy results in a susceptibility to obesity when our calorie intake is high and physical activity is low. Features of our contemporary environment that promote this level of caloric intake include soft drink consumption, meals eaten out, portion size, and advertising. Further, little physical work is required of most people and one-third of Americans report no physical activity.

The BCERF intervention that Dr. Warren described focuses on efforts to address these features of a community environment in a way that can be locally executed and sustained. Intervention sites have included a hospital, a school system, a government office building, and a nursing home. Goals have included specific increases in walking steps, and particular healthy eating choices, three days per week. The project is closely documenting its success in meeting these goals and making adjustments to address barriers. For more information, see ➤ http://envirocancer.cornell.edu/BCEResearch/obesity.cfm

The Estrogen Connection: Estrogenic Chemicals in Plastics, Personal Care Products and Electronics

This talk by Dr. Suzanne Snedeker, BCERF's Associate Director for Translational Research, provided an overview of the background science and the risk reduction strategies that comprise BCERF's Estrogen Connection Project. The Project "provides target audiences with tailored resources that suggest ways to decrease exposure to environmental estrogens found in everyday products that they may use and ways to keep these chemicals out of our common environment." The current foci, as reflected in the new BCERF videos, are estrogenic chemicals found in cosmetics and other personal care products, certain plastics, and electronics. An important current dissemination strategy is reaching high school and college students through electronic means such as YouTube and Facebook, two popular web sites, the first for video hosting and the second for social networking.

Dr. Snedeker reviewed the basic background science

supporting the Estrogen Connection approach. She discussed the relationship between levels of circulating estrogens and breast cancer risk, evidence of outside estrogenic agents, such as pharmaceuticals, playing a role in breast cancer risk, and the increasing evidence that widespread low-level exposures to the many estrogenic chemicals in our environments may contribute to risk. The ongoing work of Dr. Andreas Kortenkamp, a BCERF Forum speaker in September 2007, is contributing extensively to our understanding of this mixture effect. He and his colleagues are demonstrating additive estrogenic effects of combination exposures and environmental estrogens working together with the body's own estrogen to increase breast cancer risk.

Dr. Snedeker then gave specifics about those environmental estrogens that are the current focus of the project, including bisphenol-A (BPA), ultra-violet screens and photostabilizers, nonylphenol, and certain heavy metals known as metalloestrogens, such as cadmium, nickel, and lead. For each chemical/metal, Dr. Snedeker explained where it is found, how we might be exposed to it, and ways to reduce exposure. For example, BPA is found in No. 7 polycarbonate plastics, in epoxy resins lining metal food cans, and in dental sealants. BPA leaches from plastic bottles with wear and tear, harsh detergents, and especially heat. Therefore she recommends hand washing these bottles, not leaving them in heat, never using worn or scratched bottles, and to consider using stainless steel or glass instead. Because of the transfer of BPA from can linings to food, Dr. Snedeker recommends minimizing use of canned foods with BPA epoxy liners. For information on these environmental estrogens and ways to reduce exposure, see ➤ http://envirocancer.cornell.edu/research/endocrine/videos/summary.cfm

Heather Stone, MPH, joined BCERF in July as a program manager for the Estrogen Connection Project. She is developing, disseminating, and evaluating programming to support the Estrogen Connection videos for two target audiences, college students and community cancer groups. Heather is a new arrival from San Francisco, CA, where she recently completed her MPH in Maternal and Child Health at UC Berkeley. While in graduate school she worked on projects related to community nutrition and reproductive health. She also enjoyed volunteering in school gardens and evaluating new school lunch programs. Women's health has been a life-long focus, and she is excited to be working with BCERF on the Estrogen Connection Project.

Obesity, Phthalates, and Reflections on the Big Picture (originally titled Phthalates, Obesity, and Insulin Resistance: First Looks)

Dr. Richard Stahlhut, an Environmental Health Postdoctoral Fellow at the University of Rochester, is lead author on a paper published last year in *Environmental Health Perspectives* entitled, "Concentrations of Urinary Phthalate Metabolites are Associated with Increased Waist Circumference and Insulin Resistance in Adult U.S. Males" (Volume 115, Number 6, June 2007). We invited him to speak on this paper and the science and epidemiology in which to situate its findings. His introduction complemented Dr. Warren's talk, in that he provided further environmental and evolutionary context to help in understanding the obesity epidemic.

The background of the paper includes previous findings showing exposure to phthalates impairing rodent testicular function and being linked with anti-androgenic effects in humans, including decreased testosterone levels. Low testosterone in adult human males is associated with increased prevalence of obesity, insulin resistance, and diabetes.

The objective of Dr. Stalhut and his colleagues in their study was to investigate phthalate exposure and its associations with abdominal obesity and insulin resistance.

Phthalates are commonly used in plastics as softeners, in cosmetics and other personal care products, paints and wood finishers, toys, and many other common products. US Federal lawmakers recently agreed to a ban against their use in toys and other baby products as part of a consumer product safety reform bill, following in the footsteps of California, Washington, and Vermont, as well as the European Union and several other countries. The US ban is effective February 10, 2009; toys containing phthalates will still be on the shelves in stores for some time. Children's products, though, comprise less than five percent of the use of US-manufactured phthalates.

Stahlhut's study was cross-sectional and involved US adult males in the National Health and Nutrition Examination Survey (NHANES) 1999–2002. Dr. Stahlhut and his colleagues modeled six phthalate metabolites with prevalent exposure and known or suspected anti-androgenic activity as predictors of waist circumference and insulin resistance, adjusting for age, race/ethnicity, fat and calorie intake, physical activity, and tobacco smoke exposure in one model. They adjusted additionally for renal and hepatic function in a second model. Results showed several of the metabolites associated with increased waist circumference and insulin

continued on page 6

resistance. Adjusting for liver function attenuated but did not eliminate most of these correlations. The conclusion to the paper states, "if confirmed by longitudinal studies, our findings would suggest that exposure to these phthalates may contribute to the population burden of obesity, insulin resistance, and related clinical disorders."

Dr. Stahlhut also included in his presentation a lively discussion of our distinctive point in history in which we are exposed to chemicals for "years to decades before understanding and action." He explained, "we do not yet have adequate scientific methods or even awareness to assess complex mixture effects" and that "by the time a threat is understood scientifically," entrenched forces are at play to keep a chemical in commerce. He encouraged participants to take personal and political action to decrease exposures, but also to know that we can't "be perfect," nor do it all ourselves.

THE NEXT
Regional Cancer and Environment Forum
Monday, November 3, 2008
Stony Brook University, Long Island
Contact Carmi Orenstein for information at 607-255-1185 or cso1@cornell.edu

The Rochester Healthy Home: A Model for Integrated Toxics Education

Dr. Katrina Korfmacher is Research Assistant Professor and Community Outreach Coordinator in the Environmental Health Sciences Center (EHSC) of the University of Rochester. As Community Outreach Coordinator, she provides a link between environmental health research and the information needs of the community, with her primary focus being environmental health and justice issues of the communities in and around Rochester. She spoke about the Rochester Healthy Home – a partnership between the University of Rochester and community groups, and one of her projects related to childhood lead poisoning prevention and healthy homes – and hosted a special group tour of the facility following the Forum.

Dr. Korfmacher discussed the history of this project, beginning with the history of lead exposure and efforts to pass the local lead law in Rochester. A "Lead Lab" piloted a hands-on approach, and this type of education proved to be promising with other housing-based environmental health threats, such as mold, pests, carbon monoxide, asbestos, tobacco smoke, and toxic chemicals.

The core partners who were to establish the Rochester Healthy Home came together to discuss an integrated approach for older low-income urban homes and created their "Principles for Collaboration" in 2004. These partners included the University of Rochester EHSC, South West Area Neighborhood, Rochester Fatherhood Resource Initiative, Action for a Better Community, and Regional Community Asthma Network.

The approach of the Rochester Healthy Home includes providing: free tours in a home-like setting tailored to diverse audiences; information on health risks, home-based hazards, low cost solutions, and resources to support action; and follow up with individuals and groups. Inside the Healthy Home visitors find displays addressing chemical poisoning, lead poisoning, asthma, indoor air quality, and the solutions and resources with which to decrease those risks, such as a model "asthma-safe bedroom."

Property owners, contractors, community groups, agency staff, school children, medical students, and residents/tenants of urban housing visit the Healthy Home. In its first year, 740 visitors from 95 groups visited, 25 organizations joined the Advisory Council, and $150,000 was secured through four grants. Evaluation results show that participants contact resource agencies, make physical changes in their homes, talk to landlords of their rentals, change housecleaning habits, and teach others. Future plans to expand programming include: addressing nutrition, obesity prevention, and gardening; addressing energy efficiency and sustainability; and reaching home health care professionals.

Dr. Korfmacher described the Healthy Home as a model for low-income home education that is effective for multiple audiences, can serve as hub for community activities, and can build on existing policies and programs. Its potential sustainability and replicability offer promise for urban communities struggling with the variety of health hazards that are so often present in their housing environments.

About 25 Forum participants joined the special group tour of the Rochester Healthy Home following the program and commented enthusiastically about the value the tour added to the day. If you are interested in visiting or for more information, contact the Healthy Home at (585) 529-9957 or visit the web site. ➤ http://www2.envmed.rochester.edu/envmed/ehsc/outreach/CommunityPartners/CommunityPartnersHH.html

This article can be found on our website at: http://envirocancer.cornell.edu/Newsletter/articles/v13Spring08.cfm

Chemicals from fires may increase risk of breast cancer in women firefighters

By Susan S. Lang, Senior Editor/Senior Science Writer, Cornell Chronicle
(Originally published in the *Chronicle Online* July 14, 2008)

Firefighters can be exposed to toxic chemicals every time they respond to a call. Many of those chemicals are known to increase the risk of breast cancer, report two Cornell researchers.

To encourage women firefighters to wear their self-contained breathing apparatus (SCBA) longer than most tend to do and during all phases of firefighting, the Cornell scientists have pulled together important information on the sources of these chemicals and the types of fire scenarios where they can be encountered.

"In developing a database of chemicals in workplaces that are known to cause mammary tumors in rats, it just popped out at my colleague Nellie Brown that many of the chemicals we were studying are ones that are formed during thermal decomposition and firefighters are exposed to routinely in their work," said Suzanne Snedeker, Associate Director for Translational Research for BCERF.

Brown is director of Workplace Health and Safety Programs in Cornell's Industrial and Labor Relations School and an expert on chemicals that are generated during thermal decomposition in active and smoldering fires.

To inform women firefighters of their particular risk and what to do about it, Brown and Snedeker have co-authored a brochure that targets women firefighters. Nationally there are about 9,000 paid women firefighters.

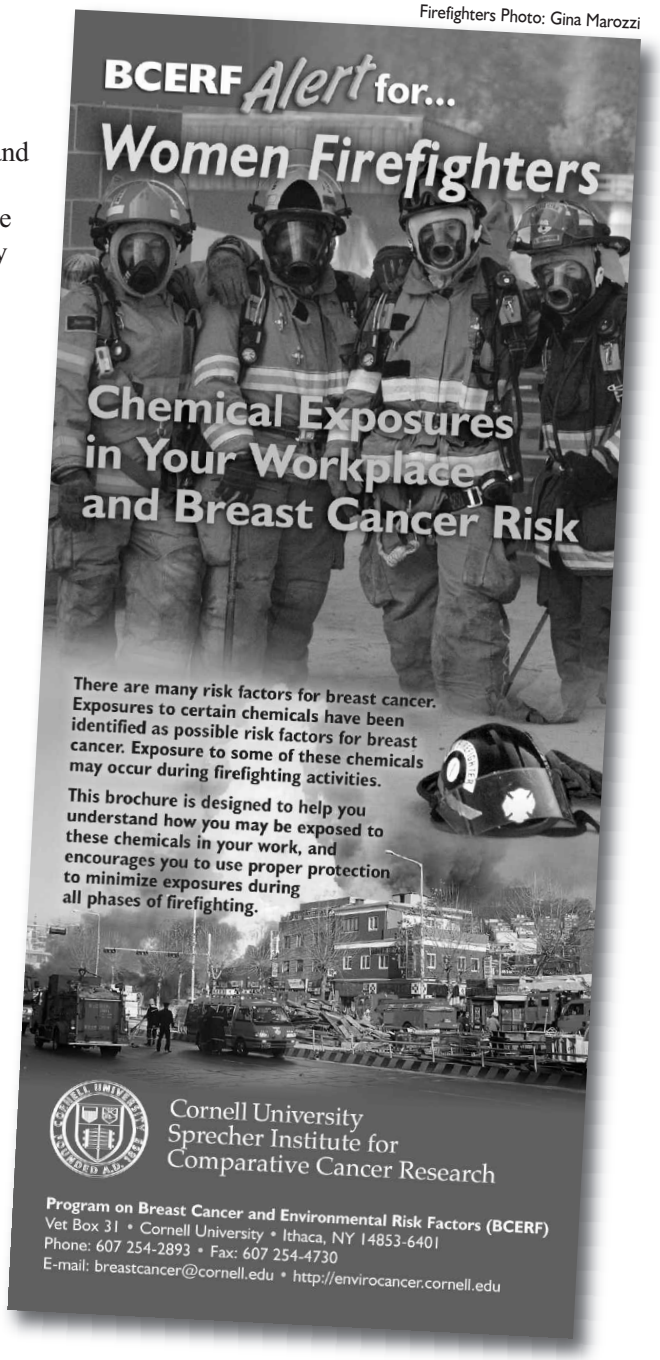
"The brochure outlines all the different types of fire scenarios and the types of chemicals that are possible breast carcinogens that result from the thermal decomposition of a host of products, from smoldering or burning of wood, to foams, glues, resins, paints, mattresses, shower stalls, coatings for wires and cables, rubber, window treatments and vinyl tubing, as well as chemicals of concern released from brush, forest and tire fires," Snedeker said.

"Our big take-home message is, wear self-contained breathing apparatus during all phases of firefighting. Put on the gear before arriving at a fire and don't take it off until the operation or inspection is completed, even during fire inspections conducted days later when chemicals can still outgas from charred remains."

Studies have shown, she added, that firefighters often don't put on their SCBA early enough and take it off too soon.

The brochure is published by the Cornell Sprecher Institute for Comparative Cancer Research and BCERF with support from the New York State Department of Health and Department of Environmental Conservation.

Firefighters Photo: Gina Marozzi



The full brochure is available at ➤ http://envirocancer.cornell.edu/learning/alert/fire08.cfm.

This article can be found on our website at:
http://envirocancer.cornell.edu/Newsletter/articles/vl3firefighters.cfm

The Ribbon is published by the Cornell Program on Breast Cancer and Environmental Risk Factors in New York State. Funding provided by the New York State Departments of Health and Environmental Conservation.

Editor
Carmi Orenstein, M.P.H., *Assistant Director*

Design
West Hill Graphics, Ithaca, NY

Approach for Responding to Cancer and Environmental Concerns
Interview with Elizabeth Lewis-Michl, Ph.D *continued from page 3*

What message do you have for those hoping to learn more than an investigation might reveal?

L-M: I share this frustration about the level of cancer we see around us. The statistics now tell us that in our current US population, one in two men and one in three women will be diagnosed with cancer at some point in their lifetime. Our risk for cancer increases with age, so as the elderly have grown as a proportion of our population, cancer rates have increased. People's concerns about the numbers of cases of cancer in their neighborhood often arise because they do not realize how frequently cancer occurs. People can take preventive steps, however. Estimates based on studies of cancer risk factors suggest that more than half of cancer deaths are preventable by not smoking, reduced alcohol consumption, healthful nutrition and regular physical activity, in addition to routine cancer screening for early detection.

My group at the CEH focuses on evaluating levels of cancer and adverse birth outcomes, particularly for areas where we have specific information about unusual exposures. While these types of studies do not provide the answers about cause and effect that people may be seeking, they do provide people with information about their community's health status; how the levels of health problems in their community compare to levels for the general NYS population. These types of health data reviews are especially useful when they focus on an area with documented unusual exposures. The findings from such studies may suggest hypotheses for more in-depth research that can draw stronger conclusions about whether the exposure is causally related to a specific adverse health effect.

Reference

Kingsley, B.S., Schmeichel, K.L., and Rubin, C.H. (2007). An Update on Cancer Cluster Activities at the Centers for Disease Control and Prevention. EHP 115, 165-171.

This article can be found on our website at:
http://envirocancer.cornell.edu/Newsletter/articles/vl3Approach.cfm

BCERF

Cornell University
Program on Breast Cancer and Environmental Risk Factors
Vet Box 31
College of Veterinary Medicine
Cornell University
Ithaca, NY 14853-6401

Phone: (607) 254-2893
Email: breastcancer@cornell.edu
Web: http://envirocancer.cornell.edu

Cornell University