The Ribbon

A Newsletter of the Cornell University Program on Breast Cancer and Environmental Risk Factors in New York State

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"Established" Risk Factors For Breast Cancer

Why do women get breast cancer? Can it be prevented? We don't know precisely why a given woman gets breast cancer, nor can we prevent it. However, we do know some of the known risk factors that are associated with breast cancer.

It must be stressed that the risk for any individual woman cannot be determined by adding up the relative risks for a population of women. Having any elevated established risk factors, however, should be incentive for a woman to try to reduce any potential risks.

In the first edition of *The Ribbon,* BCERF provided a chart entitled "Human Breast Cancer Risk Factors." The first column of this chart, reprinted below, lists "established risk factors."

Human Breast Cancer Risk Factors

Established Risk Factors

- Advancing Age
- Early Menarche
- Late Menopause
- Late Age At First Birth
- First Degree Relative With Breast Cancer

This list describes circumstances in populations of women that are **associated** with breast cancer. Having one or more of the risk factors for breast cancer does not mean an individual will get the disease, it means she is more susceptible to the disease than those without the risk factor in question.

Notice that we say "associated with breast cancer," rather than "causes of breast cancer." Research studies of populations help us understand that risk factors for a complex disease like breast cancer can at best determine an association, not an exact cause.

How is Risk Expressed?

In this article and the accompanying table (page 3) we refer to 'relative risk.' Relative risk is the comparison of the incidence of breast cancer in a population of women with a particular risk factor to that of a population of women who do not have that risk factor. Or, it can be a comparison of people at one point along a continuum, such as age, to those at another point. In expressing relative risk, a woman **without** the risk factor in question has a risk of 1.0, and the risk of women **with** the risk factor is expressed in relation to this number. A risk factor that increases a woman's risk of breast cancer by 100% presents a relative risk of 2.0.

Established Risk Factors: What Can Be Done?

When reviewing the list of established risk factors for breast cancer, it is clear that these factors cannot be easily changed to reduce risk. Nothing can be done about the

most important risk factor of all, aging. However, other established risk factors -- early menarche, late menopause, and late age at first birth -- represent trends that have been changing on a population level in the U.S.

What age women begin or cease menstruating (have their first and last periods) does not seem like an area in which women make an active choice. But there is increasing evidence that some lifestyle patterns, such as certain diets and level of physical activity, are intricately connected to women's hormonal cycle histories. BCERF is currently evaluating the research to date on related questions, such as how diet and exercise affect the age at which a girl gets her first period, as well as preparing materials to illustrate what is known about the relationship of hormones to breast cancer, and what changes women may consider making for themselves and their daughters.

The age at which a women gives birth to her first child, if she has children at all, is not typically influenced by considerations of breast cancer risk. U.S. women in general are giving birth to their first child at a later age. Importantly, this is largely attributable to social changes considered positive: more options available to women socially, in education, and in employment. Reports of the overall effect of changing childbearing trends vary, but one study estimates that later age at first birth, or women having no children, could account for almost 30% of U.S. breast cancer cases. These reports are leading some health professionals and researchers to challenge the idea that these risk factors cannot or should not be changed.

The Greatest Risk for Breast Cancer is Growing Older

Advancing age, or simply growing older, is a risk factor for cancer in general. Cancer is often referred to as a "disease of aging." The longer one lives, the more likely one is to develop cancer, and, as a population, Americans are living longer. Cancer becomes more common as people age because of the increased time for DNA mutations in cells to accumulate and because DNA repair becomes less efficient. The longer the life span, the more time for the body to be exposed to any environmental risk factors.

It is important to note that breast cancer is a relatively uncommon disease for young women. By age 35 the risk is one in 622, and by age 45, one in 93. But, by 55 the risk of developing breast cancer is one in 33, and by 65 one in 17. The often cited 'one-in-eight' statistic refers to a **lifetime** risk for a woman who lives beyond age 85. Most of this risk is expressed in the later years of a woman's life. All other risk factors for breast cancer should be considered in combination with age.

How Does a Woman's Menstrual and Childbearing History Influence Breast Cancer Risk?

Researchers have come to understand that a woman's own hormones (for example, estrogen), play an important role in breast cancer. Early menarche, late menopause, and later or no childbearing are well-established risk factors for breast cancer, all influencing a woman's lifetime estrogen exposure.

Menarche and Menopause. Consider the relative risks presented in the table on page 3. Studies suggest that women who have their first menstrual period (menarche) before age 14 has a relative risk of about 1.3 (a 30% increase in risk) compared to a woman who has her first period at age 16. Women who experience menopause at age 55 or older, has a relative risk of about 1.5 (a 50% increase in risk) compared to a woman who experiences menopause between ages 45 and 54. It seems that the more menstrual periods women have over their lifetime, or, in other words, the more of their own estrogen they are exposed to, the greater the risk of breast cancer.

Childbearing. The effect of having children early adds another dimension to this picture of breast cancer risk. Pregnancy and breast-feeding interrupt the hormonal cycles, so women who give birth to one or more children reduce the number of hormonal cycles they experience. But there seems to be another effect as well: a pregnancy carried to term before age 30 causes the breast cells to change in a way that helps prevent them from growing abnormally. Some studies show a woman's risk of breast cancer almost doubling when she has her first child after age 30, or has no biological children, compared to women who have their first child before age 20. The period of time between menarche and the first full term pregnancy — how many years this is and events that take place during that period— appears to influence breast cancer risk.

The fact that adolescents' developing breasts may be especially sensitive to carcinogens, and the fact that many health-related behaviors are set early in life, are two of the reasons behind BCERF's "Intergenerational Approach to Risk Reduction." See next issue.

Established Risk Factors for Breast Cancer

Women who have:	Relative risk is:	Compared to women with:
Menarche at age 11-14	1.3	Menarche at age 16
Menarche at age 15	1.1	
First child born at age 20-24	1.3	First child born before age 20
First child born at age 25-29	1.6	
First child born at age 30 or older	1.9	
No biological children	1.9	
Menopause at age 55 or older	1.5	Menopause at age 45-54
Menopause before age 45	0.7	
First degree relative diagnosed with breast cancer before age 60	2.0	No first-degree relatives (mother, sister, or daughter) with breast cancer
First degree relative diagnosed with breast cancer after age 60	1.4	
Two first-degree relatives with breast cancer	4.0-6.0	

Adapted from Harris et al, The New England Journal of Medicine, Vol. 327, p. 321, 1992.

Women's exposure to their own reproductive hormones has increased dramatically over time. A much later age of menarche and having many more children were the norm for most of human history. In the last 200 years the average age of menarche has dropped from age 17 to 12.8. Improved nutrition, a different diet, less exercise, and a very different social environment are all probable reasons for women's reproductive histories changing so much.

How Does Family History Influence Risk?

Family history, or, having a first degree relative (mother, sister, or daughter) with breast cancer, increases a woman's risk of getting breast cancer. Having other relatives with breast cancer, such as an aunt or grandmother, is not associated with an increased risk. A woman's risk increases more if her first degree relative's breast cancer developed before menopause or if it affected both breasts. If a woman's mother was diagnosed with breast cancer before age 60, the daughter's relative risk has been shown to be 2.0, or twice as high as a woman with no first degree relatives with breast cancer. It is important to remember that 85% of women who get breast cancer have no family history of the disease.

There has been much publicity surrounding the identification of two inherited gene alterations, BRCA1 and BRCA2, which predispose women to early-onset breast cancer. Those who do carry the alterations face a greatly increased risk of developing breast cancer, estimated to be an 85% lifetime risk. However, these gene alterations are expected to account for only 5 - 10% of the total number of breast cancer cases in the United States.

Family history of breast cancer in a particular woman's family may or may not be related to an inherited gene. Some proportion of family histories of breast cancer may be related to other, possibly environmental, risk factors that the family shares, such as environmental exposures where they live, or eating a common diet. Lifestyles can be 'inherited,' too. It is important for anyone with a family history of breast cancer to avoid considering herself "destined" to develop breast cancer, and to identify possible means of risk reduction.

Moving Toward Risk Reduction

These well established risk factors are estimated to only account for 30-40% of breast cancer in the United States. BCERF is helping to determine what may explain the remainder by working to understand the relationship between breast cancer and environmental risk factors. None of these possible environmental risk factors for breast cancer are considered 'established' at this point. Subsequent articles will provide *The Ribbon* readers with further background on environmental risk factors, and present a range of opportunities for risk reduction.

Pesticide Use in New York State and the New Pesticide Reporting Law— Questions and Answers

What is a Pesticide?

A pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, fungi, weeds, viruses or other forms of plant or animal life. Also, any substance or mixture of substances intended as a plant regulator, defoliant or desiccant is considered a pesticide.

What is a Restricted-use Pesticide?

These include:

• Any pesticide that persists in the environment, or accumulates as either the pesticide or a metabolite, or a pesticide degradation product in plant or animal tissue or product, and is not excreted or eliminated within a reasonable period of time, and which may be transferred to other forms of life: which by virtue of such persistence or accumulation creates a present or future risk of harmful effects on any organism other than the target organism.

• A pesticide which is considered to be hazardous to humans or other forms of life and which restrictions on its sale, purchase, use or possession are in the public interest.

Who Must Be Certified?

There are two classifications of certified applicators, private and commercial. Anyone using any pesticide for commercial purposes must be certified or under the direct supervision of someone who is certified as a commercial applicator. Anyone using a "restricted-use" pesticide on their own property for the production of an agricultural commodity must be certified or under the direct supervision of someone who is certified as a private applicator.

What is a Private Applicator?

A certified private applicator is someone who uses or supervises the use of restricted-use pesticides for purposes of producing an agricultural commodity on property owned or rented by the applicator or his/her employer, or (if applied without compensation other than trading of personal services between producers of agricultural commodities) on the property of another person.

What is a Commercial Applicator?

A certified commercial applicator is someone who uses or supervises the use of any pesticide, general or restricted-use, for any purpose on any property that he/she does not personally own. This includes applications completed by individuals on a "for hire" basis.

In New York State there are eleven categories of commercial certification. Briefly, they are: agricultural pest control; forest pest control; ornamental and turf pest control; seed treatment; aquatic pest control; right-of-way pest control; industrial, institutional, structural and health related pest control; public health pest control; regulatory pest control; demonstration and research pest control; and aerial application.

How Do You Become a Certified Applicator?

Candidates for private applicator certification must pass a 50-question closed book exam based on information found in the Northeast Pesticide Applicator Core Manual. At the time of the Core exam, candidates must also take a 50-question open book exam based on their specific commodity area and the 1992 Federal Worker Protection Standard. In general, employers of agricultural workers or handlers who mix, load, apply, or do other tasks such as weeding, planting, cultivation, harvesting, or tasks that bring them into direct contact with pesticides must abide by the Standard.

Candidates for commercial applicator certification must pass a 50-question closed book exam based on information found in the Northeast Pesticide Applicator Core Manual. At the time of the Core exam, candidates must also complete at least one 50-question open book exam in one or more of the eleven categories of commercial certification discussed previously.

How Do You Maintain Your Certification?

Both private and commercial applicators are required to maintain their certification by attending training classes to obtain recertification credits. Each commodity area that an applicator is certified in requires that an applicator receive a certain number of hours of credit in a 6-year period to maintain their certification.

What is Pesticide Recordkeeping?

Currently, all commercial applicators must keep records of the pesticides they use. The following information is required: the kind and quantity of each pesticide used; the EPA (Environmental Protection Agency) registration number; dosage rates; methods of application; target organisms; and the use, date and place of application for each pesticide used. These records must be maintained on an annual basis for a minimum of three years.

All private applicators must keep records of all restricted-use pesticides they use. The following information is required: restricted-use pesticides purchased, crop treated, method of application, and date of application. These records must be maintained on an annual basis for a minimum of three years.

What New Recordkeeping and Reporting Requirements Will the Pesticide Reporting Law Require from Applicators?

As of January 1, 1997 all commercial applicators shall **maintain** the following pesticide-use records for each pesticide application: EPA registration number, product name, quantity of pesticide used, date applied, location of application by address (including five-digit zip code), dosage rates, methods of application, and target organisms. These records must be maintained on an annual basis for a minimum of three years.

Commercial applicators will be required to **report** the following to NYSDEC (Department of Environmental Conservation): EPA registration number, product name, quantity of each pesticide used, date applied, location of application by address (including five-digit zip code). Changes from the existing NYSDEC reporting requirements are: date applied and location of application by address (including five-digit zip code).

All private applicators must keep records of all restricted-use pesticides they use. The following information is required: restricted-use pesticides purchased, crop treated, method of application, and date of application. These records must be maintained on an annual basis for a minimum of three years.

There are no private applicator reporting requirements. However, any qualified researcher may request site-specific information to be provided within 6 months, but not during planting or harvesting time, unless deemed mutually convenient. Who is a qualified researcher is to be determined by the Health Research Science Board established by the new Pesticide Reporting Law.

What New Recordkeeping and Reporting Requirements Will the Pesticide Reporting Law Require from Sellers?

Every person who sells or offers for sale restricted-use pesticides to private applicators shall issue a record to the private applicator of each sale of a restricted-use pesticide used in agricultural crop production to such applicator. Seller's records of sale and annual reports to NYSDEC shall include: the EPA registration number, product name of pesticide purchased, quantity of pesticide purchased, date purchased, location of intended application by address (including five-digit zip code) or by town or city if address is unavailable. Changes from the existing NYSDEC reporting requirements for sellers are: product name, quantity purchased, date purchased, and location of intended application by address.

What New Recordkeeping and Reporting Requirements Will the Pesticide Reporting Law Require from Importers and Manufacturers?

Importers and manufacturers of pesticides will keep records of all sales of restricted-use pesticides within the state. These records will include the EPA registration number, container size, and number of containers sold to NYS purchasers. Records must be maintained for not less than three years, and an annual report submitted to NYSDEC.

Eric Harrington is an Extension Support Specialist in the Cornell University Pesticide Management Education Program

The logo on the opposite page is from the Pesticide Management Education Program. You may contact them at 5123 Comstock Hall, Cornell University, Ithaca, NY 14853-0901; phone: 607-255-1866; fax: 607-255-3075.

"We Need to Know"

Ad Hoc Discussion Group

"Learning Together"

The attendance at BCERF Ad Hoc Discussion Group meetings is steadily holding at around 40 participants, including those who join us via telephone. The presence at the September 25, 1996 meeting was no different, and we would like to thank the NYS Department of Health (NYSDOH) for their assistance and use of their conference room for this meeting.

After brief introductions, June Fessenden MacDonald, Director of BCERF, reported on program activities in the areas of research, outreach and public education. On the research front, Suzanne Snedeker, research project leader, is close to completing her critical evaluations of the three triazine pesticides (atrazine, simazine and cyanazine). To expand the number of pesticides under review, a research associate is to be hired. (Editor's note: started November 1, 1996)

BCERF has been particularly busy in the outreach and education areas. There have been numerous contacts and programs with Cornell Cooperative Extension Associations, breast cancer groups in western and central NYS, agricultural groups, federal and state agencies, non-profit groups such as the American Cancer Society, and corporate groups. For example, June Fessenden MacDonald was a featured speaker at a Smith Barney Symposium on Risk Management of Breast Cancer at the New York State Theater at Lincoln Center in early September. Also on the program were Senator Alfonse D'Amato, and Congresswomen Nita Lowey and Carolyn Maloney.

Carol Devine, Education Project Leader, spoke in many forums, such as an American Cancer Society-Smith Barney Symposium in Utica in October. Congressman Sherwood Boehlert was another featured speaker at that program. Extension Project Leader Carmi Orenstein's many outreach activities were described.

Also, requests for information and for newsletters and fact sheets continue to increase. As of November 1, BCERF expects to have a full-time administrative coordinator hired, improving the program's ability to respond in a timely manner.

The participants were then given an update by Robert Haggerty of the NYS Department of Environmental Conservation (NYSDEC) and Bill Smith of Cornell's Pesticide Management Education Program, on the pesticide-use software development. Bob Haggerty discussed the Pesticide Record Keeping and Reporting Requirements Law of 1996. He was followed by Bill Smith who described the software development and budget that has been submitted to NYSDEC. Henry DeVries, electronic technology specialist with Cornell Cooperative Extension, then mentioned his role providing computer programming support to get the pesticide-use software development project started.

After the lunch break, Suzanne Snedeker spoke on the triazine pesticides and evidence of their relationship to breast cancer. Her presentation included an overview of her critical evaluation on atrazine, noting that there are limited human studies on these pesticides and cancer, and therefore most of the evidence to date is drawn from experimental animal studies. She also informed the group that cyanazine production will be terminated by the end of 1999. Since the Ad Hoc Discussion Group had never been briefed on the process and components of a BCERF critical evaluation, these were also discussed.

Three brief presentations on breast cancer-related Cornell research projects followed. The first speaker, Jerome DeCosse, MD, the Lewis Thomas University Professor of Surgery at the New York Hospital-Cornell Medical Center, spoke about his physiological study of the effects of dietary fiber on estrogen metabolism. He described how the results will contribute to the understanding of molecular events leading to carcinogenesis.

(continued on next page)

The next Ad Hoc Discussion Group meeting will take place on Friday, February 21, 1997 in Room 711A of the Legislative Office Building, Albany, NY. Ad Hoc Discussion Group meetings are open to any and all stakeholders to come together to discuss issues related to breast cancer and environmental risk factors

Next, Banoo Parpia, Research Associate in the Cornell University Division of Nutritional Sciences, spoke about the Cornell-Oxford-China Nutrition project. She outlined diet, lifestyle and mortality data in China, indicating how cancer is a regional disease in this country. (For more information on this study, visit the web site at http://www.newcenturynutrition.com).

Finally, Rodney Dietert, Director of the Institute for Comparative and Environmental Toxicology and Professor of Immunogenetics in the Department of Microbiology and Immunology at the Cornell College of Veterinary Medicine ended this series of presentations with a talk on biomarkers in breast cancer research. He discussed the importance of filling research gaps in 'chemical exposure biomarkers,' by seeking to include the best analytical technologies and human chemical analysis in breast cancer studies.

The meeting ended with a discussion on setting future meeting dates and places. The group decided that we would have three statewide meetings annually. The times for the next two meetings are: Friday, February 21, 1997 in Albany, NY followed by one on June 25, 1997 in the Western area of NY.

Carin Rundle, Executive Secretary
Ad Hoc Discussion Group

WHAT'S NEW "ON THE WEB"

http://www.cfe.cornell.edu/bcerf/

What you've all been waiting for—the electronic version of our factsheet on "DDT, DDE and Breast Cancer Risk" is finally posted on the BCERF web site!! It's linked to the DDT and DDE Bibliography which lists over 70 references grouped by sub-topic. I have also created a new web page for hyperlinks to "Policy and Legislation on Pesticides". This includes links to "Federal Register-Environmental Subset", and links to the newly amended "1996 Safe Drinking Water Act". We have also pointers to new web sites including the "National Action Plan for Breast Cancer" web site—go to the "Hyperlinks to Related Sites" menu, then select the "General Information on Breast Cancer" section to find the NAPBC site, and explore some of our other links while you're there. The "Conference and Workshop" page has been updated by our new research associate, Dr. Serge-Alain Wandji. Be a BCERF browser!!

Suz Snedeker, BCERF "Webmaster"

Please mark the appropriate request, print your name and address and mail or fax to:

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—add me to your mailing list

—send me a copy of the BCERF Information Sheet

PLEASE SEND ME THE FOLLOWING FACT SHEETS:

—DDT, DDE and the Risk of Breast Cancer
__Phytoestrogens and Breast Cancer: Another Reason to Eat Your Vegetables

PLEASE SEND ME THE FOLLOWING FACT SHEET WHEN AVAILABLE:

__Understanding Breast Cancer Rates

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Cornell Cooperative Extension

BCERF Educational Advisory Committee Up and Running

In October, the BCERF Educational Advisory Committee met for the first time. With an ambitious agenda for the day, the group set out to begin serving in its critical role of advising BCERF on educational objectives and strategies, and as reviewers of educational materials.

The members of this Committee work, on a volunteer or professional basis, with a range of different groups, all important audiences for BCERF's educational messages and programs. Cornell Cooperative Extension Educators on the Committee represent the areas of agriculture, environment, nutrition, youth development, and consumer education. Two breast cancer groups, one upstate and one on Long Island, are represented. The Committee also has representation from an important cancer institute, Roswell Park in Buffalo, and a hospital in central New York State in a region with high breast cancer rates.

We appreciate the willingness of the members to serve in this role, and look forward to carrying out BCERF's public education component together.

Members of BCERF's Educational Advisory Committee

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Cornell Cooperative Extension of Ontario County
Barbara Bellows
Agricultural Environmental Planning
Cornell University
Colleen Karuza
Roswell Park Cancer Institute
Kathy Rau
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The Ribbon is published by the Cornell Program on Breast Cancer and Environmental Risk Factors in New York State. Comments are welcome; contact the Editor

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