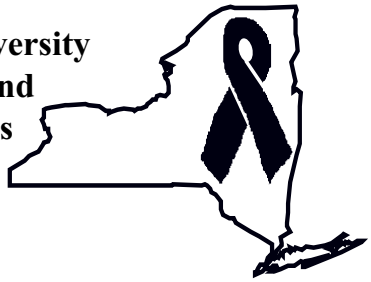
The Ribbon

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



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Fundamentals for Interpreting Breast Cancer Epidemiology

Our knowledge and understanding of the links between environmental factors and breast cancer risk comes primarily from **observational epidemiologic studies**. These studies are designed to examine the association between a disease and various exposures in the physical, biological, nutritional and social environment. The complex nature of these investigations, however, often makes them difficult to understand and interpret. A broader understanding of the nature of epidemiology, as well as familiarity with the more detailed features of specific epidemiologic study designs, can help the lay person better understand the results of this type of scientific research. The purpose of this brief overview is to describe the key features of the most frequently encountered study designs, using examples of well-known studies that shape current understanding of the etiology, or causes, of breast cancer.

Epidemiology is the study of the distribution and factors involved in the development of a disease in human populations. The primary research aim of an epidemiologic study is to assess the relationship between an environmental factor (**exposure**) and the disease of interest (**outcome**). The public health objective of such studies however, is to identify those exposures which are changeable and could lead to prevention, thereby minimizing the **prevalence** and **incidence** (see definitions) of the disease in the population. This requires that epidemiologic research must strive to establish that the exposure is a "cause" of the disease. In view of these objectives, it is important to recognize that the basis of all epidemiologic evidence is statistical and probabilistic. Most epidemiologic investigations are not designed to establish cause and effect (**causality**) between exposure and outcome.

Prevalence: *quantifies the proportion of individuals in a population who have the disease at a specific instant and provides an estimate of the probability (risk) that an individual will have the disease at a specific point in time.*

Incidence: *quantifies the number of new cases of disease that develop in a population of individuals at risk during a specific time.*

Epidemiologic studies can be broadly grouped into two types: experimental studies and non-experimental (observational) studies. Experimental studies, including clinical and field intervention trials, are more scientifically rigorous in design in that the exposure (in this context referred to as treatment or intervention) is under the direct control of the researcher. Experimental studies may provide evidence on causality by demonstrating that the exposure is a "cause" of the outcome. Non-experimental, observational studies in contrast, can only demonstrate an "association" between exposure and outcome, and as such do not establish causality. Observational epidemiological studies can be cross-sectional (both exposure and outcome being measured simultaneously at one point in time) or

longitudinal (exposure and outcome are measured or estimated at different points in time). The main types of observational epidemiologic studies on breast cancer include ecologic studies, case-control studies and cohort studies, the characteristics of which are described below.

Randomized Clinical Trials

The randomized clinical trial is perhaps the most effective type of experimental epidemiologic study used to test the effects of an intervention, such as a drug, new therapy or other medical intervention. In this type of study the subjects are usually a group of patients identified as "eligible" study subjects (those who meet the study criteria) who are randomly assigned to the experimental and control groups in the study. The clinical trial most closely resembles a controlled laboratory experiment. The investigator assigns study subjects to the treatment and control groups being compared, and thereby decides who is exposed to the treatment or intervention of interest. The main conclusions of these studies are derived on the basis of various tests of statistical significance, such as the well-known t-test. The primary methodological issues in these types of studies are concerned with avoiding systematic bias and increasing the chance of detecting a real difference between groups.

♦ ***EXAMPLES:*** Perhaps the most familiar randomized clinical trials on breast cancer are recent studies that focused on the effects of the drug tamoxifen. Although these studies showed a significant inhibitory effect of the drug on breast cancer, the study design could not address the effects of the treatment on other outcomes and conditions. In fact, tamoxifen was later shown to increase the risk of uterine and liver cancer and is no longer considered a "miracle" drug for breast cancer. Other experimental studies however, have yielded potentially useful results for the treatment of breast cancer. For example, conclusions derived from randomized clinical trials comparing radical mastectomy versus lumpectomy have resulted in less invasive surgical interventions for breast cancer patients, i.e. many fewer mastectomies.

Ecologic or Population Studies

Studies in which the unit of observation is a group of people or a "population" (most often cities, counties or nations) are known as ecologic studies or population studies. The outcome in these types of studies is most often an incidence or mortality rate for a specific disease, and the exposure is often an overall average or index measure of the environmental factor of interest. These studies are recognized for their contributions in describing differences in populations and for generating novel hypotheses for further investigation. Amongst the main shortcomings of most ecologic studies is the lack of data necessary to control for the effects of **confounding factors** (see box), as well as the problem of inappropriate inferences, better known as the "ecologic fallacy."

Table 1

Type of Study	Defining Feature	Primary Statistical Measure
EXPERIMENTAL STUDIES		
•Randomized Clinical Trials	Patients as subjects	t-test; other tests of statistical significance
•Field Intervention Trials	Healthy people as subjects	t-test; other tests of statistical significance
•Community Intervention Trials	Healthy group of people as subjects	t-test; other tests of statistical significance
NON-EXPERIMENTAL (OBSERVATIONAL) STUDIES		
•Cross-sectional Ecologic/Population/ Correlation Studies	Unit of observation is the group or population	Correlation coefficients; various regression coefficients
•Cross-sectional Individual-Level Studies	Unit of observation is the individual	Correlation coefficients; various regression coefficients
•Case-Control (Retrospective) Studies*	Outcome is measured in the present; Exposure is typically measured retrospectively	Odds Ratio (OR)
•Cohort/Follow-up (Prospective) Studies	Exposure is measured in the present; Outcome is measured prospectively on follow-up	Relative Risk (RR)

*Case-control studies nested within a cohort study are prospective in design

Confounding Factors

An important consideration in epidemiologic research is that an observed association (or lack of one) between an exposure and an outcome may be due to the effects of a third factor that is associated with the exposure and independently affects the risk of developing the disease. This is referred to as **confounding**. The extraneous factor is called a **confounding factor** or **confounder**.

In observational epidemiologic studies, confounding factors are most often controlled for in statistical analyses. For example, studies evaluating the effects of a pesticide exposure on breast cancer risk, would control for other breast cancer risk factors (confounding factors). Examples of confounding factors that have been controlled for in studies on chemical exposures and breast cancer risk include: age of menarche, menopausal status, reproductive history, lactation, body mass index, use of hormone therapy, diet, alcohol consumption, family history of breast cancer, and history of benign breast disease.

♦ ***EXAMPLES:*** The Cornell-China-Oxford Project is a unique ecologic study that combines data on a very large number of outcomes and a comprehensive set of environmental exposures in a singular population at a significant time in its epidemiologic history. Further, unlike other such studies, data are available for two different points in time, tracking changes and trends in the population characteristics. These unique study features address the shortcomings of other ecologic studies. Moreover, this approach allows researchers to examine the strength and consistency of multiple dimensions of a specific relationship in depth within a wider context. This landmark study provides strong evidence indicating that a long-term plant-based diet may offer the best protection for breast cancer risk. Other well-known ecologic investigations include numerous international correlational studies. For example, a widely cited, international correlational study evaluating the relationship between breast cancer and fat intake provides compelling evidence for this dietary hypothesis. This evidence however, is compromised by the fact that breast cancer may vary internationally with many determinants other than fat intake. In other words, the relationship may be confounded by other factors related to both breast cancer and fat intake, and lack of data on these other factors makes the conclusions less reliable.

Case-Control Studies

Case-control studies are designed to compare people with the disease to those without the disease. In contrast to the outcome data that defines the two groups being compared, exposure data in typical case-control studies is collected retrospectively. Thus case-control studies are often referred to as retrospective studies. The majority of studies designed to examine the effects of environmental factors on breast cancer incidence are case-control studies. The advantages of case-control studies are that they are relatively inexpensive and can be completed in a short period of time, allowing researchers to evaluate data on the effects of a range of exposures on the outcome. The main statistic of interest derived from case-control studies is the odds ratio (OR), which indicates the probability of having the disease for the exposed group compared to the unexposed group. The primary methodological issues in these types of studies include issues related to the matching of cases and controls, various types of information bias, particularly recall bias, as well as use of the appropriate statistical adjustment techniques for the effects of known confounding factors.

♦ ***EXAMPLES:*** The Long Island Breast Cancer Study Project, designed to evaluate the effects of various environmental contaminants, including organochloride compounds (OCC) and polycyclic aromatic hydrocarbons (PAH), on breast cancer incidence, is a population-based case-control study in Nassau and Suffolk counties. Data are currently being collected and analyzed by researchers and the results are expected to be published over the next few years. Three of the studies on DDE and DDT exposure and breast cancer risk, reviewed in this issue of *The Ribbon*, are examples of retrospective case-control studies on breast cancer.

Cohort Studies

Cohort studies are designed to compare people who are exposed to the factor(s) in question, to those who are unexposed. These studies are sometimes referred to as "follow-up" or prospective studies, because the study follows subjects over time to determine outcome differences in the two or more groups being followed. Prospective studies provide stronger evidence of causality than retrospective studies but are often more costly and difficult, especially if the outcome takes a long time to develop or if it is very rare. Unlike experimental studies, controlling the effects of other factors is done by statistically adjusting the relationship between exposure and outcome. The relative risk (RR) of getting the disease for exposed versus unexposed subjects is the primary statistic of interest that is derived directly from the results of prospective studies. Frequently, data collected in cohort studies are used to generate a **nested case-control study** in which exposure data is available prospectively and a sufficient number of cases have occurred for meaningful statistical analysis. This is a particularly efficient way of

utilizing exposure data from biological samples collected when the study was initiated. Expensive laboratory testing is therefore conducted only for the cancer cases and appropriately matched controls, and not for the entire cohort of study subjects.

♦***EXAMPLES:*** There are several well-known, ongoing prospective studies on women's health that continue to yield valuable information on various outcomes, including breast cancer. The Nurses Health Study initiated by researchers at Harvard University is a prospective study of 120,000 nurses and the results to date have provided strong evidence for the effects of reproductive factors, alcohol intakes, and body size on breast cancer risk. Other prospective studies that promise to provide valuable information for understanding the etiology of breast cancer include the Women's Health Initiative (WHI) and the New York University (NYU) Women's Health Study. The WHI focuses on the effects of low-fat dietary pattern and exogenous hormones, whereas the NYU study emphasizes the role of endogenous hormones and diet on breast cancer incidence and other diseases that affect women's health. The Agricultural Health Study is yet another prospective effort designed to study the effects of pesticides and other environmental contaminants on health outcomes including breast cancer.

The results of such ongoing epidemiologic studies as described above, while not proving direct cause, will undoubtedly broaden our understanding of the relationship between breast cancer and environmental risk factors. BCERF and all those interested in contributing to reducing the risk of breast cancer, look to all of these investigations to help guide these efforts.

Written by Banoo Parpia, Senior Research Associate, Division of Nutritional Sciences, Cornell University.

Banoo Parpia, Ph.D.

Senior Research Associate

Banoo Parpia is a Senior Research Associate in the Division of Nutritional Sciences at Cornell University and chief coordinator of the well-known Cornell-China-Oxford Project on nutrition, environment and health. Her educational background is broad and varied, reflecting her many personal and professional interests. Her training includes a bachelor's degree in Physics from the University of Bombay, another bachelor's degree in Sociology from S.U.N.Y. Cortland and a master's degree and Ph.D. in Demography, Social Epidemiology and International Nutrition, from Cornell University. This background has provided her with considerable expertise in epidemiology and statistical methods, with an emphasis on the nutritional and sociocultural aspects of health and well-being.

In her role as coordinator of a large and comprehensive epidemiologic investigation on the dietary determinants of disease in China, Banoo is involved with research on diverse aspects of nutrition and health. She has published extensively on various aspects of diet and disease, having co-authored over 30 scientific manuscripts in peer-reviewed journals. In addition, she continues to give numerous talks and presentations on the ongoing findings emerging from this study to various groups including Cornell Cooperative Extension, New York State legislators and other audiences that have a stake in the health of women in New York State. She is particularly interested in issues related to women's health, including breast cancer, osteoporosis and coronary heart disease. Moreover, her involvement in breast cancer research goes beyond her professional interests in that the ethnic group to which she belongs, the Parsis of India, has the highest reported rate of breast cancer in the world.

She has supported BCERF from the outset and continues to be actively involved with various activities and efforts of the program. Most recently, she has developed an educational fact sheet for the general public on "Understanding Breast Cancer Rates," which is available through the BCERF office.

Mark Your Calendars!!!

Ad Hoc Discussion Group meeting
Friday, February 27, 1998
Room 711A of the Legislative Office Building, Albany NY
11:00am to 4:00pm.

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.

The Breast Cancer Core Questionnaire Project

The accompanying article, *Fundamentals for Interpreting Breast Cancer Epidemiology,* discusses some of the important features of epidemiologic studies. Increasingly, researchers are combining the data from multiple studies and analyzing this data in aggregate to increase statistical power and strengthen conclusions. Researchers doing these "meta-analyses" need to standardize measurement of important variables across studies in order to facilitate analysis. Fortunately, there is an exciting project taking place that may help mitigate this major stumbling block in understanding breast cancer risk factors.

The Breast Cancer Core Questionnaire Project

The National Action Plan on Breast Cancer (NAPBC), coordinated by the U.S. Public Health Service's Office on Women's Health, is a public-private partnership whose key objective is to stimulate rapid progress in eradicating breast cancer by "jump-starting" innovative, long-term efforts in six priority areas. Each priority area has a corresponding Working Group, including a Breast Cancer Etiology Working Group ("etiology" is the branch of medicine dealing with the causes of a disease). A main activity of the Etiology Working Group is to develop a "core questionnaire" to improve the availability, quality, and comparability of data on risk factors for breast cancer. This Breast Cancer Core Questionnaire (BCCQ) Project is a collaborative effort of NAPBC, the National Cancer Institute (NCI), and Temple University's Institute for Survey Research (ISR).

The unique scientific features of the BCCQ support this goal of improving the epidemiologic study of breast cancer risk factors. Its six questionnaire modules integrate the biomedical and behavioral sciences, comprehensively covering the known and suspected risk factors for breast cancer. These modules are designed with three levels of increased depth, with designated "core questions."

The six modules of the BCCQ, and the leader of each respective module's design team are:

Medical and Reproductive History, *Janet Daling, Ph.D., Fred Hutchinson Cancer Research Center*
Sociodemographic and Cultural Factors, *Nancy Krieger, Ph.D., Harvard School of Public Health*
Occupational Exposures, *Ann Aschengrau, Sc.D., Boston University School of Public Health and Julia Brody, Ph.D., Silent Spring Institute*
Environmental Exposures, *Steven Stellman, Ph.D., M.P.H., American Health Foundation*
Personal Behaviors and Lifestyle, *Leslie Bernstein, Ph. D., University of Southern California*
Diet and Nutrition, *Lenore Kohlmeier, Ph.D., University of North Carolina*

Unique Features of the BCCQ Modules

Design teams with wide expertise and diversity developed these modules, which both stand alone and complement one another. For example, as Dr. Ellen Werner of Temple University's Institute for Survey Research explained at a recent presentation about the BCCQ, the Medical and Reproductive History module, which seeks to accurately capture information on known risk factors for breast cancer, will help researchers understand the possible confounding relationships between some of these known risk factors, and suspected risk factors. Characteristics such as parity may potentially confound analyses relating occupational, environmental, or other exposures with the risk of breast cancer.

Similarly, the Sociodemographic and Cultural Factors module seeks to further clarify some relationships that have not been completely understood to date. Dr. Krieger has designed this module to provide more nuanced and complete information on factors such as socioeconomic position, race/ethnicity/religious affiliation, and family status. For example, the module addresses the possible relationships between religious participation and affiliation, and lifestyle questions such as alcohol consumption and dietary patterns.

The modules on Occupational and Environmental Exposures have the potential to make significant contributions to the many research gaps in this area. As Dr. Brody pointed out from her experience contributing to the development of the Occupational Exposures module, very little has been done thus far looking at women's work histories and breast cancer incidence. The Occupational Exposures questionnaire is designed to obtain a comprehensive adult occupational history, addressing all paid and unpaid jobs held for at least six months, since age 16.

A highlight of the Environmental Exposures module is an extensive questionnaire on residential history, which includes a very detailed pesticide section. This questionnaire seeks to obtain information on pesticides used in and around any of the respondent's homes, yards, or gardens, by the respondent, other household members, or professionals. Importantly, questions concerning insect repellents on the skin, hair and clothing are included, as are pet treatments.

The Personal Behaviors and Lifestyle module covers the areas of exercise, smoking (including "passive

smoking"), and "over the counter" and other drug use. The other major lifestyle area, diet and nutrition, is covered in a module which includes detailed questions that will provide important information in promising areas of breast cancer risk reduction: fruit, vegetable and soy consumption.

Unique Organizational Features of the BCCQ Project

In addition to the individual design team which developed each module, there is a review team, and together these groups represent a wide range of universities, federal government institutes and agencies, regional health departments and community liaisons. Breast cancer activists have also been fully involved in the design, review and focus group evaluation of the modules.

In September 1996, these diverse participants in the project met at a workshop to finalize drafts of the modules and identify core questions within each module that will comprise the core questionnaire. The focus groups, conducted by Dr. Werner between November 1996 and September 1997, discussed whether the items in each questionnaire were relevant, clear, unambiguous, comprehensible, and acceptable. Currently, each module and the core questionnaire are undergoing revisions to incorporate changes from these focus groups discussions. Dr. Werner will also develop an instructions manual that will be available with the completed questionnaire in May 1998. Researchers who are interested in using the modules in their studies should contact Dr. Werner at (202) 973-2820. For copies of the final report on the focus groups, contact Joan Becker at (202) 401-9587.

Research Commentary

Human Studies on DDT/DDE and Breast Cancer Risk

Terminology Key

ng/g = nanograms of the chemical per gram sampled tissue (blood, blood fat, fat, etc.)
- a nanogram is one billionth of a gram
- ng/g is the same as parts per billion (**ppb**)
- one ng/g is equivalent to one ounce in about 7,490,000 gallons

μg/g = micrograms of the chemical per gram sampled tissue
- a microgram is one millionth of a gram
- μg/g is the same as parts per million (**ppm**)

OR = Odds Ratio (see Table 1)
RR = Relative Risk (see Table 1)

During the last six months, four new case-control studies have been published on body levels of DDT or DDE and breast cancer risk. These studies were conducted in Mexico City (López-Carrillo et al., 1997), Europe (van't Veer et al., 1997), New England (Hunter et al., 1997), and western New York State (Moysich et al., 1998). The major conclusions of all four studies were that high levels of DDE in the bodies of women did not appear to increase the risk of breast cancer, and in some of these studies, an inverse relationship was shown. This update provides brief descriptions of these studies, an overview of their strengths and limitations, and introduces some research questions that still need to be addressed.

DDT serum levels and breast cancer risk: A case control study from Mexico. The study by Lopez, et al. examined breast cancer risk in 141 pre- and post-menopausal women with breast cancer (cases) and 141 hospitalized women without breast cancer or other cancers (controls). The average level of DDE, a major break down product of DDT, in the blood (serum) of women with breast cancer was 562.5 ng/g compared to 505.5 ng/g in the hospitalized women without breast cancer. These differences were not statistically different. Even when the women with the highest levels of DDE were compared with those with the lowest levels of DDE, there was no increased risk of breast cancer (OR=0.97). Strengths of this study include that it was conducted in a country that still uses the insecticide DDT for malaria control, and that the women in the study resided in Mexico City for at least twenty years. Further, the researchers controlled for confounding factors that can affect breast cancer risk, including body size, duration of lactation, parity (number of births), menopausal status, and family history of breast cancer. Limitations included the use of hospital-based controls; if DDE levels were influenced by injuries or disease states, this could have affected the results of the study.

DDT and post-menopausal breast cancer in Europe: A case-control study. Van't Veer, et al. did not find a significant difference in the average level of DDE in a fat sample from the buttock area in 265 European post-menopausal women with breast cancer (1.35 μg/g) compared to hospitalized women without breast cancer (1.51 μg/g). In the Netherlands and Northern Ireland, the average levels of DDE were virtually identical in women with and without breast cancer, while in Germany, Switzerland and Spain, levels of DDE were higher in women without breast cancer compared to women with breast cancer. The fat samples from women with breast cancer were obtained seven days after hospital admission, but the published study results contained no information on whether the samples were obtained before or after surgery or chemotherapy. The study did control for many confounding factors, including parity, use of hormone replacement therapy, estrogen receptor status in women with breast cancer, time since menopause, history of breast cancer,

history of benign breast disease, and current alcohol use. The study did not control for lactation history, which is important, since breast milk is a route of excretion for DDE.

Plasma organochlorine levels and the risk of breast cancer. The women in the prospective, nested case-control study by Hunter, et al. were drawn from the large cohort of women enrolled in the Nurses Health Study. The blood samples were obtained two to three years before the women developed breast cancer and they were matched with women from the same cohort that did not develop breast cancer. The average levels of DDE in the blood (plasma) of 236 women with breast cancer was 6.01 ppb compared to a slightly higher average level of 6.97 ppb in the 236 women without breast cancer. Further statistical analyses indicated that the women with the highest levels of DDE had a non-significantly lower risk of breast cancer (RR=0.72) as compared to the women with the lowest levels of DDE. High serum levels of PCBs (polychlorinated biphenyls) also were not associated with increased breast cancer risk. Strengths of this study included that it was prospective and controlled for many confounding factors, including history of breast cancer, history of benign disease, age at menarche, parity, age at birth of first child, duration of lactation and body size. The only positive statistical association of DDE with breast cancer risk factors identified in the control population in this study was that the women with the largest body mass tended to have higher levels of DDE in their blood.

Environmental organochlorine exposure and post-menopausal breast cancer risk. The study conducted on post-menopausal women from western New York State compared blood levels of DDE in 154 women with breast cancer with 192 women from the same community who did not have breast cancer. Levels of other organochlorines, including PCBs, Mirex and hexachlorobenzene (HCB) were also examined. One of the major strengths of this study was that it looked at the effect of lactation history on organochlorine levels and breast cancer risk. In the women that had lactated, the average levels of DDE in the blood (serum) were very similar in 85 women that had breast cancer (10.36 ng/g) compared with the 106 women without breast cancer (10.44 ng/g). In parous women that had never lactated, levels of DDE were higher in 46 women with breast cancer (13.16 ng/g) compared to the 61 non-lactating women without breast cancer (10.82 ng/g). But further statistical analysis indicated that risk was not significantly elevated in those women with the highest levels of DDE compared with those with the lowest levels of DDE who had never lactated (OR =1.83). This does point to the need to consider lactation history in studies evaluating the role of chemicals that persist and concentrate in breast fat, since breast feeding is a major route of excretion of these chemicals. What about other organochlorines? Researchers did find some evidence of increased risk of breast cancer in women with elevated blood levels of Mirex or PCBs, but only in parous women who had never lactated.

What are some of the major questions that have not yet been answered? One major question concerns differences in exposures to different forms and breakdown products of DDT. Not all forms of DDT and DDE are estrogenic, therefore, not all exposures would be expected to result in increased breast cancer risk. Some components of sprayed DDT were estrogenic, especially the form called o,p'-DDT. But, the most prevalent form of DDT currently in the environment, and present in food residues such as contaminated fish, is the non-estrogenic break down product called p,p'-DDE. Unfortunately, blood levels of DDE, as measured in these epidemiological studies, do not reveal what form of DDT a person may have been exposed to in

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

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__*Fact Sheet #3*--Understanding Breast Cancer Rates

__*Fact Sheet #4* --Reducing Pesticide Exposure in the Home and Garden: Alternatives and Proper and Legal Use Resource Sheet

__*Fact Sheet #5*--The Biology of Breast Cancer

__*Fact Sheet #6*--Tumor Suppressor Genes—Guardians of Our Cells

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the past. Therefore, a population could have high levels of DDE in their blood, but their exposure may have been to the non-estrogenic form of DDE. Studies of populations known to have been exposed to the sprayed estrogenic form of DDT are lacking. One population that has not been followed are native and American families that resided near the Panama Canal, an area sprayed daily with DDT for many years to control for malaria. Other research questions that need to be explored more fully include the role of early, *in utero* exposures to DDT and breast cancer risk, and if other factors, like diet and exercise, may play a role in modifying effects of estrogenic organochlorines.

Prepared by Suzanne M. Snedeker, BCERF Research Project Leader

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López-Carrillo, L., et al. (1997). Dichlorodiphenyltrichloroethane serum levels and breast cancer risk: a case-control study from Mexico. Cancer Research 57, 3728-3732.

Moysich, K. B., et al. (1998). Environmental organochlorine exposure and postmenopausal breast cancer risk. Cancer Epidemiol. Biomarkers Prev. in press. Thanks to Dr. Moysich for providing the manuscript for review.

van't Veer, P., et al. (1997). DDT (dicophane) and post-menopausal breast cancer in Europe: case-control study. British Medical Journal 315, 81-85.

For more information:

See Snedeker, S.M. (1996) DDT, DDE and Breast Cancer Risk, Fact Sheet #2, Cornell University, BCERF.

The BCERF web site has additional information on DDT/DDE and other chemicals and environmental risk factors. A fact sheet on DDT/DDE (**http://www.cfe.cornell.edu/bcerf/fctsht.ddt.html**) is available, as are extensive bibliographies on DDT/DDE and other chemicals (**http://www.cfe.cornell.edu/bcerf/biblist.html**). There is a page for researchers **(http://www.cfe.cornell.edu/bcerf/link.scient.html**) which includes links to tumor registries, on-line scientific journals, and search engines. In addition BCERF maintains an extensive searchable bibliographic database on environmental risk factors (the ERF database at **http://www.cfe.cornell.edu/bcerf/libsearch.html)**.

Please note: The regular "What's New on the Web" column will appear in the next newsletter.

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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