



Risk in Perspective

Breast Cancer: What Are the Perceived Risk Factors?

"The samples of laypeople and scientists had differing perspectives about the possible factors contributing to the reported rise of breast cancer."

The annual death rate among women from all causes in the United States, adjusted for age, declined from 5.02 deaths per 10,000 women in 1970 to 3.60 per 10,000 women in 1992. However, this track record of progress is not evident for all causes of death. One of the troublesome areas is breast cancer, where the annual age-adjusted mortality rate was 2.31 per 10,000 women in both 1970 and 1990. There has been a modest (5%) decrease in the early 1990s among white women, but the recent data for black women are less encouraging.

Even more troubling are the reported trends in the number of new cases of breast cancer, the so-called incidence rate. Unlike the mortality rate, which is influenced by progress in treatment of breast cancer, the incidence rate (at least in theory) is an indicator of the cumulative impact of human exposures to the numerous risk factors for breast cancer. Although there is no comprehensive national database on the incidence of breast cancer, the data that are available from selected regions in the United States indicate that the reported incidence of invasive breast cancer increased from 8.43 per 10,000 in 1973 to 11.31 per 10,000 in 1992 among white women and from 6.87 per 10,000 to 10.10 per 10,000 among black women during the same time period. It is possible that much or all of these increases are attributable to improvements in detection of breast tumors (e.g., due to greater use of mammographies), but many experts believe there has been a modest, increasing trend in the incidence of breast cancer in the United States.

In a pilot survey conducted in November 1995, we asked random samples of laypeople and scientists about their perceptions of various factors that may be contributing to the reported increases in breast cancer in the United States. In this issue of **RISK IN PERSPECTIVE**, we report the responses to this pilot question. The information about breast cancer perceptions is certainly timely, since October 1996 is "Breast Cancer Awareness Month."

Design of the Survey

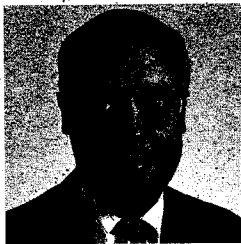
The respondents include a random sample of 1,019 Americans in the lower 48 states and 264 scientists who were either randomly selected from the rolls of the Institute of Medicine, were honorary fellows of the Society for Risk Analysis, were deans of schools of public health in the United States, or had recently published research on a variety of specific health hazards. The sample of scientists should not be considered experts in the etiology of breast cancer since they were selected on the basis of their general expertise in health-related fields or on the basis of specialized expertise in various technological hazards.

Each respondent was told the following: "The government reports that the rate of breast cancer in the United States has been increasing steadily for several decades. In addition to better detection of tumors, many explanations have been offered for this trend. On a scale from 0 to 10, where 10 means complete confidence that the item does contribute to the rise in the rate of breast cancer, and 0 means complete confidence that the item does not contribute to the rise in the rate of breast cancer, please indicate how confident you are that each item (below) has contributed to the rise in the rate of breast cancer."

Respondents were then asked (in rotated order for lay respondents) about the following items: more women are overweight, more use of chemicals, more exposure to pesticide residues on foods, more exposure to electric and magnetic fields (EMFs), girls are reaching puberty at an earlier age, young women are delaying their first delivery (birth), fewer women are breast feeding, and more women are taking estrogen therapy after menopause. These particular items, although not a comprehensive list, were selected on the basis of their coverage in the mass media and scientific journals as possible risk factors for breast cancer.

A response from 0 to 10 was elicited for each item, with a response near 5 intended to indi-

Liza Greene, HMS Media Services



John D. Graham, Ph.D.
Center Director

Liza Greene, HMS Media Services



Kim Clemente
Research Assistant

Liza Greene, HMS Media Services



Roberta Glass
Research Assistant

Harvard Center for Risk Analysis
Harvard School of Public Health
718 Huntington Avenue
Boston, Massachusetts
02115-5924

617 432-4497
www.hsph.harvard.edu/orga-
nizations/hcra/hcra.html

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FURTHER READING:

Kelsey, J.L. and Bernstein, L. Epidemiology and Prevention of Breast Cancer. *Annual Review of Public Health*. 1996: 17:47-67.

Pike MC, Spicer DV, Dahmouch L, and Press MF. Estrogens, progestogens, normal breast cell proliferation, and breast cancer risk. *Epidemiology Review*. 1993: 15:17-35.

PEER REVIEWERS:

Nancy Isaac, Sc.D.
Lorenz Rhomberg, Ph.D.

cate a lack of confidence one way or the other. A "don't know" or "no opinion" response was not offered to respondents. In the few cases where respondents volunteered a "don't know" or "no opinion" response for a particular item, we assigned the value 5 for purposes of the summary statistics reported here. In a pilot survey of 50 Massachusetts residents, we verified that respondents understood the scale, used it as we had intended, and provided responses near 5 when they were undecided or didn't have a strong opinion.

For analytical purposes, we defined "confidence" that an item is a risk factor for breast cancer as a score of 7 or greater. The results reported below, comparing laypeople and scientists, are not sensitive to whether this cut-off value is 6, 7, or 8.

The lay interviews were conducted by random digit dial telephone calls, with three attempts made at each number. In contrast, the scientists received a written questionnaire in the mail that they were asked to return, which they did at a response rate of 61% (after several rounds of reminders).

Results

The samples of laypeople and scientists had differing perspectives about the possible factors contributing to the reported rise of breast cancer (see table 1). The percentage of laypeople reporting a confidence score of 7+ was highest for "more use of chemicals" (51.8%), followed by "more women are overweight" (32.6%), "more exposure to pesticide residues on foods" (31.4%), "more women are taking estrogen therapy after menopause" (26.4%), "more exposure to electric and magnetic fields" (24.0%), "fewer women are breast feeding" (21.1%), "girls are reaching puberty at an earlier age" (19.1%), "young women are delaying their first birth" (16.0%). The percentage of the scientists reporting a confidence score of 7+ was significantly smaller for some items (chemicals, pesticides, electric and magnetic fields) but significantly larger for others (especially earlier puberty, delayed childbearing, less breast-feeding, and more use of estrogen therapy)

Note:

"Confidence" is defined as a score of 7 or greater on a scale where 10 indicates complete confidence that the factor is contributing to the rise of breast cancer and 0 means complete confidence that the factor is not contributing to the risk of breast cancer.

* = significant at p=0.05
** = significant at p=0.10
*** = significant at p=0.001

Table 1 reports comparisons for the sample of scientists and the sample of laypeople. The sample of scientists has too few women (20%) to permit a separate analysis by sex. Within the layperson sample, women are more confident than men in each of the factors mentioned as possible risk factors for breast cancer. Interestingly, there is no significant difference between the confidence ratings of the women and scientists for several potential risk factors (being overweight, early puberty, breast feeding, and estrogen use).

Implications

The differing perceptions of laypeople and scientists raise some interesting questions. First, and perhaps most importantly, whose perceptions are correct? Although current knowledge of the causes of breast cancer may be insufficient to resolve this question definitively, it would be interesting to administer this same question to a blue-ribbon panel of specialists in the biology and epidemiology of breast cancer. Second, which perceptions are having the greatest influence on the allocation of research funding into the possible causes of breast cancer? A comprehensive inventory of current research programs on possible risk factors for breast cancer would be of interest in order to determine which perceptions are driving the course of scientific research. Hypotheses that have greater plausibility to scientists may deserve some priority but it is possible that elected officials and funders respond more to what laypeople are concerned about or perceive to be important. We leave to readers of RISK IN PERSPECTIVE the challenge of answering the following question: Whose perceptions, laypeople's or scientists', should drive the allocation of taxpayer dollars to research about the possible causes of breast cancer?

As scientists gain better understanding of the risk factors for breast cancer, perception research of this type will be important in the design of health education and promotion campaigns. It will also be important to learn how different subpopulations of women (e.g., pre-versus postmenopausal respondents) perceive the risk factors and how they might respond to different kinds of risk information.

Table 1: Percentage of Respondents with "Confidence" in Stated Factor as a Contributor to the Increased Incidence of Breast Cancer in the United States

	Scientists	Female Lay Sample	Male Lay Sample
Overweight	37.1	39.6	25.5**
Chemical Use	25.6	56.3***	47.3***
Pesticide Residues	14.1	34.5***	28.3***
EMFs	5.1	29.6***	18.4***
Earlier Puberty	28.5	23.0	15.1***
Delayed Childbearing	42.4	19.3***	12.7***
Less Breast Feeding	30.1	24.9	17.4***
Estrogen Use	32.9	32.6	20.0***