



Breast Cancer and Environmental Risk Factors

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FACT SHEET #8

Q & A's from the Cornell University Program on Breast Cancer

Childhood Life Events and the Risk of Breast Cancer

Researchers are asking whether women and young girls may be able to reduce breast cancer risk by early adoption of healthful behaviors, such as eating plenty of fruits, vegetables, whole grains and beans, and getting regular exercise. Also, minimizing young girls' exposure to cancer-causing agents may be important in reducing their risk of breast cancer.

Why are researchers investigating breast cancer risk factors during childhood and adolescence?

Breast cancer is a disease that may develop and progress over the course of a woman's entire life. During puberty, breast cells are rapidly dividing. Since cells undergoing rapid division are more likely to be damaged by cancer-causing agents, environmental exposures before or during puberty may be important in determining a woman's lifetime risk of developing breast cancer. Also, researchers are beginning to assess whether healthful diet and exercise habits in young girls may help to prevent the development of breast cancer later in life.

Although it is possible that factors in early life affect the risk of breast cancer, we have very little information on what those factors are and how we should alter them. In the meantime, understanding influences on established risk factors for breast cancer, such as age at menarche (a girl's first menstrual period), may provide hints about early influences on breast cancer risk.

Why is age at menarche a risk factor for breast cancer?

Breast cancer is a disease that is thought to be related to high lifetime exposure to the hormone estrogen. Estrogen is needed for normal reproductive development and estrogen levels in the body rise at menarche. The earlier a girl starts menstruating, the more menstrual cycles she will have, and

the greater will be her exposure to estrogen during her child-bearing years. Height, weight, diet, exercise, and family history have all been found to influence age at menarche.

How do height, weight and body fat distribution affect the age at menarche?

There is a trend towards an earlier age at menarche among girls living in industrialized countries. Taller, heavier girls generally start menstruating earlier than shorter, lighter girls. In addition, the distribution of fat on a girl's body is related to the levels of hormones circulating in her body and may affect her age at menarche. Girls with fat localized around their hips (pear shaped), may have an earlier menarche than girls with abdominal fat (apple shaped). However, girls with abdominal fat are more likely to be obese and have higher levels of another hormone called insulin. Increases in insulin and growth hormone influence the levels of insulin-like growth factor (IGF-1), which may promote cancer in breast tissue. Height, weight and the distribution of body fat are influenced by heredity. However, diet and exercise behaviors that help maintain healthy weight may prevent changes in hormone levels that could promote the development of breast cancer.

How might childhood diet influence breast cancer risk?

Diet may affect age at menarche. In some reports, girls who ate more fiber, vegetables, nuts and seeds had a later age at menarche. However, these findings did not take into account



weight and height, which could also have influenced age at menarche. In other studies, which did take weight and height into consideration, the results differed. Three studies found no influence of diet on age at menarche while one reported that a high intake of fat was associated with an early age at menarche. There is no compelling evidence that any particular food group has a strong influence on a girl's age at menarche.

Other possible ways that childhood diet might influence breast cancer risk include: 1) protection or repair of developing breast cells by nutrients from foods such as vitamin E and beta-carotene, 2) enhanced effects of carcinogenic (cancer-causing) components in food during early breast development, 3) the influence of diet on hormone levels, particularly estrogen, and 4) maintenance of overall health and a strong immune system.

Very few studies have assessed the influence of diet during childhood on the risk of developing breast cancer as an adult. In these studies, women were asked to remember what they ate as children, a difficult task for anyone. Also, memories may differ in women who have been diagnosed with cancer compared to those who have not. Several different types of food have been studied.

Fat intake: There is conflicting evidence on whether fat intake during childhood and adolescence is a risk factor for the development of breast cancer. Two studies reported no association between fat consumption during childhood and the development of breast cancer. Two other studies reported an increased breast cancer risk associated with the consumption of the fat on meat or fried meat.

Diets lower in calories and animal products: One recent study reported a decrease in the incidence of breast cancer among Norwegian women who were adolescents during World War II. During the war they had a decrease in total food consumption and a diet which consisted of less meat and milk, and more fish, vegetables and potatoes than before or after the war.

Vegetable and fruit intake: A recent U.S. study reported a slight, but non-significant association between high fruit and vegetable intake in childhood and reduced breast cancer risk in adults.

Vegetarian diet: Two studies did not show any association between a vegetarian diet during adolescence and the risk of breast cancer in adults. Two others demonstrated

that girls who ate a vegetarian diet or had high intakes of dietary fiber had lower levels of circulating estrogens. This suggests that a diet high in vegetables, fruits, and whole grains may contribute to a reduction in body estrogen levels.

Dairy products: In animal studies and in studies using human breast cells, a component of milk called conjugated linoleic acid was found to be an anticarcinogen (protects against the development of cancer). However, this finding has not been adequately confirmed in humans.

Currently, there is no strong evidence supporting a role for childhood nutrition in the development of breast cancer. Most studies did not take into account the effect of established risk factors for breast cancer, such as age at menarche or height and weight. Future studies need to more carefully account for other breast cancer risk factors. However, it is important to establish healthy eating habits early in life to promote long term health.

How might exercise during adolescence influence breast cancer risk?

Several studies have reported a decrease in breast cancer risk associated with regular exercise. Exercise may reduce a girl's risk of breast cancer by decreasing the level of estrogen in her body, decreasing her weight, decreasing her insulin resistance, strengthening her immune system, or increasing her age at menarche.

Generally, athletes have a later age at menarche compared to non-athletes. The influence of moderate exercise on age at menarche is less clear. Some researchers have reported that girls who are moderately active (non-athletes) have differences in hormone levels and a delay in the onset of menstruation compared to inactive girls. Others have reported no effect of moderate physical activity on the age at menarche. Differences in the way the researchers assessed physical activity or problems with recall of earlier exercise practices may account for the differences in results. Later age at menarche in athletes may also be due to heredity.

Does obesity during childhood and/or adolescence affect breast cancer risk?

There are no data to suggest that adolescent obesity is a risk factor for the development of breast cancer. In fact, a few studies have suggested that a heavier weight in adolescence may be protective. However, gaining weight and being obese as an adolescent may be important for other reasons. Overweight



adolescents are more likely to be overweight adults, and it is harder for people to lose weight as they get older. Gaining weight and being overweight as an adult are thought to be risk factors for postmenopausal breast cancer. Therefore, it is important to establish a healthy lifestyle and healthy weight during adolescence.

Are there risks to promoting healthy eating and exercise among young girls?

Although age at menarche is an established risk factor for breast cancer, attempts to delay a girl's menarche are not advisable. The normal establishment of regular menstrual cycles is critical for reproduction. Delaying a girl's menarche via dieting, extreme weight loss and/or vigorous and stressful exercise may affect her ability to have children later. Also, emphasis on dieting and weight may contribute to eating disorders such as anorexia and bulimia. Girls who have started to menstruate, and exercise and diet too vigorously can actually cause their periods to stop, and can experience severe bone loss. Therefore, an active lifestyle that allows normal development should be the goal during adolescence.

Adolescent life-style factors and the risk of breast cancer:

Smoking cigarettes: Few studies have examined smoking during adolescence as a risk factor for breast cancer. However, some researchers think that smoking at a young age may be important because the carcinogens in cigarette smoke may cause more damage during adolescence when the breast cells are rapidly dividing.

Alcohol consumption: Alcohol consumption has been identified as a likely risk factor for breast cancer, but the influence of alcohol consumption in adolescence is not clear. It is not yet clear whether drinking at an early age, lifetime alcohol consumption or the intensity of drinking is most important. Encouraging teenagers not to drink may lessen their lifetime consumption of alcohol.

Oral contraceptives: Studies of oral contraceptive use and breast cancer risk have focused on adult women who started taking birth control pills when they were in their 20's. Today, the pill is a much more popular form of birth control among teenagers. Since there are natural hormonal differences between adolescent girls and adult women, the use of the pill in teenagers deserves special consideration. Indeed, a couple of studies have reported that there might be a slight increase in risk associated with early use of oral contraceptives. However, more studies

that take into account the lower dose of hormones present in today's birth control pills are needed.

Are there any other risk factors that girls and their mothers should be aware of when thinking about breast cancer?

Radiation: The first clue that exposure to radiation during adolescence may increase the risk of breast cancer came from studies of atomic bomb survivors, especially those who were less than 15 years old at the time of the bomb. Recent studies have demonstrated that children who received radiation treatment for a type of cancer called Hodgkin's disease or children who received x-ray treatment for scoliosis (abnormal curvature of the spine) showed an increased incidence of breast cancer. Today, doctors use a lower dose of radiation, take the x-rays of the spine from the back, and cover the breasts with a lead apron to decrease the risk of exposing the breasts to x-rays. Sometimes a girl needs to have an x-ray. However, parents should take an extra precaution by asking if the x-ray is necessary.

Pesticides: There are no studies that look at the influence of pesticide exposure in children on the development of breast cancer. However, some research has shown that children, because of their smaller size, take in more contaminants from air, water and food, than adults. In addition, they absorb and retain more of certain contaminants and are less efficient at detoxifying them or repairing the damage the contaminants may have caused.

Once studies currently underway regarding pesticide exposure in adults and the risk of breast cancer (see BCERF fact sheet #2) are complete, the issue of time of exposure can be addressed. Until then, in the absence of definite information regarding this potential risk, it would be a good idea to keep children away from pesticides and other chemicals (see BCERF fact sheet #4).

What should I do now?

There are a lot of factors that may influence a person's risk of developing breast cancer. Some of these, like age at menarche and genetic factors, are beyond our control. However, others like diet, exercise, smoking and alcohol intake are under our control. By setting a good example and encouraging our daughters and other young girls to eat well, stay physically fit and avoid smoking and drinking, we may give them a better chance of avoiding breast cancer later in life.



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An extensive bibliography on "Childhood Influences on Breast Cancer Risk" is available on the BCERF web site <http://www.cfe.cornell.edu/bcerf/>

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