

BREAST CANCER PREVENTION

Breast cancer is the most common cancer among women, other than skin cancer. It is the second leading cause of cancer death in women, after lung cancer. We know that about 192,200 women in the United States will be found to have invasive breast cancer in 2001. About 39,600 women will die from the disease.

BREAST CANCER RISK FACTORS

A *risk factor* is anything that increases a person's chance of getting a disease. Different cancers have different risk factors. For example, unprotected exposure to strong sunlight is a risk factor for skin cancer. Smoking is a risk factor for cancers of the lung, mouth, larynx, bladder, kidney, and several other organs.

But having a risk factor, or even several, does not necessarily mean that a person will get the disease. Some women with one or more breast cancer risk factors never develop the disease, while most women with breast cancer have no apparent risk factors. Even when a woman with breast cancer has a risk factor, there is no way to prove that it actually caused her cancer.

The following is a list of known and suspected risk factors for breast cancer:

Gender: Simply being a woman is the main risk factor for developing breast cancer. Because women have many more breast cells than men do and perhaps because their breast cells are constantly exposed to the growth-promoting effects of female hormones, breast cancer is much more common in women. Men can develop breast cancer, but this disease is about 100 times more common among women than men.

Ageing: A woman's risk of developing breast cancer increases with age. About 77% of women with breast cancer are over age 50 at the time of diagnosis. Women younger than 30 years old account for only 0.3% of breast cancer cases. Women in their thirties account for about 3.5% of cases.

Genetic Risk Factors: Recent studies have shown that about 10% of breast cancer cases are due to inherited mutations in breast cancer related genes and that most of these result from mutations (changes) of the **BRCA1** and **BRCA2** genes. Normally, these genes help to prevent cancer by making proteins that keep cells from growing abnormally. However, if a person has inherited a mutated gene from either parent, chances of developing breast cancer increase. About 50% to 60% of women with inherited BRCA1 or BRCA2 mutations will develop breast cancer by the age of 70. Women with these inherited mutations also have an increased risk for developing ovarian cancer.

A genetic test is available that uses a blood sample to analyze DNA from a woman to see if she has inherited a mutated BRCA1 or BRCA2. If a mutated BRCA is found, the woman and her health care team can schedule more frequent exams to monitor for early signs of cancer. Some women may choose to take the medication tamoxifen in an attempt to reduce the

likelihood of developing breast cancer. Some women at very high risk of developing breast cancer may choose to have a prophylactic mastectomy, that is, surgery to remove their breasts before cancer develops. BRCA mutations also increase ovarian cancer risk. Physicians may recommend removal of the ovaries after childbearing or after menopause, as there are currently no reliable methods of screening for ovarian cancer.

The American Cancer Society strongly recommends that any person considering genetic testing should talk to a genetic counselor, nurse or doctor qualified to interpret and explain these test results, before they proceed with testing. It is very important for people to understand and carefully weigh the benefits and risks of genetic testing before these tests are done. Testing is expensive, and is not covered by some health plans. *There is concern that people with abnormal genetic test results will not be able to get life insurance, or coverage may only be available at a much higher cost.*

Family History of Breast Cancer: Breast cancer risk is higher among women whose close blood relatives have this disease. Blood relatives can be from either the mother's or father's side of the family. Having one first-degree relative (mother, sister, or daughter) with breast cancer approximately doubles a woman's risk, and having two first-degree relatives increases her risk 5-fold. Although the exact risk depends on several factors, women with a family history of breast cancer in male family members also have an increased risk of breast cancer.

Race: White women are slightly more likely to develop breast cancer than are African-American women. But African Americans are more likely to die of this cancer because they are often diagnosed at an advanced stage when breast cancer is harder to treat and cure. Asian, Hispanic, and American Indian women have a lower risk of developing breast cancer.

Previous Breast Biopsy: Women whose earlier breast biopsies were diagnosed as *proliferative breast disease without atypia* or *hyperplasia* have a slightly higher risk of breast cancer (1.5 to 2 times greater than other women do). A previous biopsy result of *atypical hyperplasia* increases a woman's breast cancer risk by 4 to 5 times. Having a biopsy diagnosed as fibrocystic changes without proliferative breast disease does not affect breast cancer risk.

Previous Breast Irradiation: Women who have had chest area radiation therapy as a child or young woman, as treatment for another cancer (such as Hodgkin's disease or non-Hodgkin's lymphoma) are at significantly increased risk for breast cancer.

Menstrual periods: Women who started menstruating at an early age (before age 12) or who went through menopause at a late age (after age 50) have a slightly higher risk of breast cancer.

Birth Control Pill use: It is still not clear what part oral contraceptives (birth control pills) might play in breast cancer risk. A recent analysis using data from most of the large, well designed, published studies found that women now using oral contraceptives have a slightly greater risk of breast cancer than those women not using them. Other studies have shown no increased risk. Women who stopped using oral contraceptives more than 10 years ago do not

appear to have any increased breast cancer risk. When considering using oral contraceptives, women should discuss their other risk factors for breast cancer with their health care team.

Not Having Children: Women who have had no children or who had their first child after age 30 have a slightly higher breast cancer risk.

Hormone Replacement Therapy: Most studies suggest that long-term use (5 years or more) of conventional Hormone Replacement Therapy (HRT) after menopause may slightly increase your risk of breast cancer. The data is unclear whether Natural Hormone Replacement increases risk.

The risk of conventional HRT applies only to current and recent users, and a woman's breast cancer risk appears to return to that of the general population within 5 years of stopping HRT. The decision to use hormone replacement therapy after menopause should be made by the woman and her doctor after weighing the possible risks and benefits. Natural Hormone Replacement may be the best option. Factors to consider include your other risk factors for breast cancer, osteoporosis (thinning and weakening of bones), and the severity of menopausal symptoms.

Not Breast Feeding: Some studies suggest that breast feeding may lower breast cancer risk by as much as 50%, especially if breast feeding is continued for 1.5 to 2 years. Other studies found no impact on breast cancer risk.

Alcohol and Tobacco: Use of alcohol and tobacco is clearly linked to increased risk of developing breast cancer. Compared with nondrinkers, women who consume one alcoholic drink a day have a very small increase in risk, and those who have 2 to 5 drinks daily, have about 1.5 times the risk of women who drink no alcohol.

Obesity and High-Fat Diets: Obesity (being overweight) is associated with an increased risk of developing breast cancer, especially for women after menopause (which usually occurs at age 50). The connection between weight and breast cancer risk is complex, however. For example, risk appears to be increased for women who gained weight as an adult but not among those who have been overweight since childhood. Also, excess fat in the waist area affects risk more than the same amount of fat in the hips and thighs. Researchers believe that fat cells in various parts of the body have subtle differences in their metabolism that may explain this observation.

Studies of fat in the diet as it relates to breast cancer risk have often given conflicting results. Most studies found that breast cancer is less common in countries where the typical diet is low in total fat, low in polyunsaturated fat, and low in saturated fat. On the other hand, many studies of women in the United States have not found breast cancer risk to be related to dietary fat intake. Researchers are still not sure how to explain this apparent disagreement. Many scientists note that studies comparing diet and breast cancer risk in different countries are complicated by other differences (such as activity level, intake of other nutrients, genetic factors) that might also alter breast cancer risk.

More research is needed to better understand the impact of fat intake (especially the types of fat eaten) and body weight on breast cancer risk. But, these factors have been shown to affect the risk of developing several other types of cancer, and intake of certain types of fat is clearly

related to heart disease risk. The American Cancer Society recommends maintaining a healthy weight and limiting your intake of red meats, especially those high in fat or processed.

Physical Inactivity: Exercise and cancer is a relatively new area of research. Recent studies indicate that strenuous exercise in youth might provide life-long protection against breast cancer, and that *even moderate physical activity as an adult can lower breast cancer risk*. Additional research is underway to confirm these findings.

Factors with Uncertain, Controversial, or Unproven Impact on Breast Cancer Risk

- Antiperspirants
- Underwire bras
- Abortion
- Environmental Pollution
- Breast implants – Silicone or Saline

Steps to Prevent Breast Cancer

While no one is sure how to completely prevent breast cancer, the following steps are recommended based on current clinical research:

- **Eat A Low Fat Diet.** The best choice is the Mediterranean Diet, which concentrates on whole foods, fruits, vegetables, beans, seeds and nuts with olive oil as the main cooking oil. Ask your caregiver for more information.
- Other diet suggestions include:
 - Juice with raw fruits and vegetables at least twice a week.
 - Add garlic and ginger to foods for flavor and antioxidant activity.
 - Eat phytonutrient-rich foods such as broccoli, cauliflower, Brussels sprouts and kale. All contain indole-3-carbinol, which promotes breast health.
 - Drink green tea daily.
 - Increase your intake of healthy fats through fish oil-rich fish such as salmon, cod and haddock, as well as monounsaturated extra-virgin olive oil.
 - Eat soy and flax daily, unless you have estrogen-dependent cancer.
 - Avoid eating well-done, burned or charred meats.
 - Limit your intake of alcohol to no more than one glass a day.
- **Exercise Regularly:** Three times a week at the minimum.
- **Take Anti-Oxidant Vitamins A,C,D and E**
Anti-oxidants help the body clear free-radicals which are thought to promote cancer formation. Vitamin E should be the ‘mixed’ form with gamma-tocopherol and tocotrienols, not just alpha-tocopherol.

- **Take Co-Enzyme Q10** 100mg three times a week in gel form, not tablet or powder.
- **Take Indole-3-Carbinol** 200mg per day – this may help convert cancer causing types of estrogens into less dangerous forms.
- **Take Alpha Lipoic Acid** 50-100 mg per day - this is a versatile antioxidant that is both fat- and water-soluble. It has the ability to neutralize the toxic effects of radiation and chemotherapy as well as recycle other antioxidants such as vitamins C and E.
- **Take Melatonin, especially if you work midnights.** Melatonin is a sleep-regulating hormone that decreases with age. Studies show that women with low melatonin levels are at higher risk of breast cancer, prompting some scientists to hypothesize that melatonin deficiency may promote the development of cancer. Melatonin boosts the overall immune response that can help neutralize metastasized cancer cells. As a bonus, it will help you sleep better. In general, patients under the age of 40 are not deficient in melatonin and do not need supplementation. **Caution:** Patients suffering from leukemia, Hodgkin's disease or multiple myeloma should not take melatonin.
Start with 1-3 mg prior to bedtime, and work your way up in 3-mg increments to about 6 mg, keeping in mind the potential for side effects such as vivid dreams and, very rarely, headaches. At these doses, you must work closely with your physician.

Protecting Breast Cells Against Dangerous Estrogens

The stronger form of estrogen, estradiol, can be converted into the weaker form, estriol, in the body without using drugs. Estriol is considered to be a more desirable form of estrogen. It is less active than estradiol, so when it occupies the estrogen receptor, it blocks estradiol's strong "growth" signals. Using a natural substance the conversion of estradiol to estriol increased by 50% in 12 healthy people (Michnovicz et al. 1991). Furthermore, in female mice prone to developing breast cancer the natural substance reduced the incidence of cancer and the number of tumors significantly. The natural substance was **indole-3-carbinol (I3C)**.

Indole-3-carbinol (I3C) is a phytochemical isolated from cruciferous vegetables (broccoli, cauliflower, Brussels sprouts, turnips, kale, green cabbage, mustard seed, etc.). I3C given to 17 men and women for 2 months reduced the levels of strong estrogen, and increased the levels of weak estrogen. ***But more importantly, the level of an estrogen metabolite associated with breast and endometrial cancer, 16--a-hydroxyestrone, was reduced by I3C*** (Bradlow et al. 1991).

When I3C changes "strong" estrogen to "weak" estrogen, the growth of human cancer cells is inhibited by 54-61% (Telang et al. 1997). Moreover, I3C provoked cancer cells to self-destruct (kill themselves via apoptosis). Induction of cell death is an approach to suppress carcinogenesis and is the prime goal of cytotoxic chemotherapy. The increase in apoptosis induced by I3C before initiation of new tumor development may contribute to suppression of tumor progression. Nontoxic I3C can reliably facilitate apoptosis (12 week treatment in rats); thus, this phytonutrient may become a standard adjunct in the treatment of breast cancer (Zhang et al. 2003)

I3C does more than just turn strong estrogen to weak estrogen. 16-a-Hydroxyestrone (16-OHE) and 2-hydroxyestrone (2-OHE) are metabolites of estrogen in addition to estriol and estradiol. 2-

OHE is biologically inactive, while 16-OHE is biologically active; that is, like estradiol, it can send "growth" signals. In breast cancer, the dangerous 16-OHE is often elevated, while the protective 2-OHE is decreased. Cancer-causing chemicals change the metabolism of estrogen so that 16-OHE is elevated. Studies show that people who take I3C have beneficial increases in the "weak" estriol form of estrogen and also increases in protective 2-OHE.

I3C Stops Cancer Cells from Growing

A study on rodents shows that damaged DNA in breast cells is reduced 91% by I3C. Similar results are seen in the liver (Devanaboyina et al. 1997). Female smokers taking 400 mg of I3C significantly reduced their levels of a major lung carcinogen. Cigarette chemicals are known to adversely affect estrogen metabolism (Taioli et al. 1997).

There is no proven way to prevent breast cancer, but the best and most comprehensive scientific evidence so far supports phytochemicals such as I3C (Meng et al. 2000). The results from a placebo-controlled, double-blind dose-ranging chemoprevention study on 60 women at increased risk for breast cancer demonstrated that I3C is a promising chemopreventive agent for breast cancer prevention (Wong et al. 1997). The results of a single-blind phase I trial which studied the effectiveness of I3C in preventing breast cancer in nonsmoking women who are at high risk of breast cancer are awaited. The rationale for this study is that I3C, ingested twice daily, may be effective at preventing breast cancer.

A summary of studies shows that indole-3-carbinol (I3C) can:

- Increase the conversion of estradiol to the safer estriol by 50% in healthy people in just 1 week (Michnovicz et al. 1991)
- Prevent the formation of the estrogen metabolite, 16,α-hydroxyestrone, that prompts breast cancer cells to grow (Chen et al. 1996), in both men and women in 2 months (Michnovicz et al. 1997)
- Stop human cancer cells from growing (54-61%) and provoke the cells to self-destruct (apoptosis) (Telang et al. 1997)
- Inhibit human breast cancer cells (MCF7) from growing by as much as 90% in vitro (Ricci et al. 1999)
- Inhibit the growth of estrogen-receptor-positive breast cancer cells by 90%, compared to tamoxifen's 60%, by stopping the cell cycle (Cover et al. 1999)
- Prevent chemically induced breast cancer in rodents by 70-96%. Prevent other types of cancer, including aflatoxin-induced liver cancer, leukemia, and colon cancer (Grubbs et al. 1995)
- Inhibit free radicals, particularly those that cause the oxidation of fat (Shertzer et al. 1988)
- Stop the synthesis of DNA by about 50% in estrogen-receptor-negative cells, whereas tamoxifen had no significant effect (Cover et al. 1998)
- Restore p21 and other proteins that act as checkpoints during the synthesis of a new cancer cell. Tamoxifen has no effect on p21 (Cover et al. 1998)
- Virtually eliminate DNA damage and cancer prior to exposure to cancer-causing chemicals (in animals fed I3C) (Grubbs et al. 1995)

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- Reduce DNA damage in breast cells by 91% (Devanaboyina et al. 1997)
- Reduce levels of a major nitrosamine carcinogen in female smokers (Taioli et al. 1997)

The suggested dose of indole 3 carbinol is 200-400 mgm per day.

Reliable Sources of Vitamins and Other Supplements

Metagenics

www.drpez.com

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www.gnc.com

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