



The Association of Minimally Invasive Gynecologic Surgeons

...dedicated to safe, state-of-the-art surgery and health life-styles for women of all ages

What Are the Risk Factors for Breast Cancer?

A risk factor is anything that increases your chance of getting a disease, such as cancer. Different cancers have different risk factors. For example, exposing skin 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 mean that you will get the disease. Most women who have one or more breast cancer risk factors never develop the disease, while many women with breast cancer have no apparent risk factors (other than being a woman and growing older). Even when a woman with breast cancer has a risk factor, there is no way to prove that it actually caused her cancer.

There are different kinds of risk factors. Some factors, like a person's age or race, can't be changed. Others are linked to cancer-causing factors in the environment. Still others are related to personal choices such as smoking, drinking, and diet. Some factors influence risk more than others, and your risk for breast cancer can change over time, due to factors such as aging or lifestyle.

Risk Factors You Cannot Change

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

Aging: Your risk of developing breast cancer increases as you get older. About 17% of invasive breast cancer diagnoses are among women in their 40s, while about 78% of women with invasive breast cancer are age 50 or older when they are diagnosed.

Genetic risk factors: Recent studies have shown that about 5% to 10% of breast cancer cases are hereditary as a result of gene changes (called mutations). The most common mutations are those of the BRCA1 and BRCA2 genes. Normally, these genes help to prevent cancer by making proteins that keep cells from growing abnormally. However, if you have inherited either mutated gene from a parent, you are at increased risk for breast cancer.

See the section "[Do We Know What Causes Breast Cancer?](#)" for more information about genes and DNA. Women with an inherited BRCA1 or BRCA2 mutation have up to an 80% chance of developing breast cancer during their lifetime and at a younger age than those women who are not born with one of these gene mutations in their cells. Women with these inherited mutations also have an increased risk for developing ovarian cancer. Although BRCA mutations are found most often in Jewish women of Ashkenazi (Eastern Europe) origin, they are also seen in African-American women and Hispanic women, many of whom have the kind of mutation seen in Ashkenazi Jewish women.

Other genes have been discovered that might also lead to inherited breast cancers. One of these is the ATM gene. ATM stands for ataxia-telangiectasia mutation. The gene is responsible for repairing damaged DNA. Certain families with a high rate of breast cancer have been found to have mutations of this gene. Another gene, the CHEK-2 gene, also increases breast cancer risk about twofold when it is mutated. Neither one of these genes, however, is a frequent cause of familial breast cancer. But in women who carry the CHEK-2 mutation and have a strong family history of breast cancer, the risk is greatly increased.

Inherited mutations of the p53 tumor suppressor gene can also increase your risk of developing breast cancer, as well as leukemia, brain tumors, and/or sarcomas (cancer of bones or connective tissue). The **Li-Fraumeni syndrome**, named after the 2 researchers who described this inherited cancer syndrome, is a rare cause of breast cancer.

If you are considering genetic testing, it is strongly recommended that first you talk to a genetic counselor, nurse, or doctor qualified to interpret and explain these tests. It is very important 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 insurance plans. There is concern that people with abnormal genetic test results will not be able to get life insurance or that coverage may only be available at a much higher cost, but many states have passed laws that prevent insurance companies from denying insurance on the basis of genetic testing. To learn about the laws in your state, you can go to this internet site -- <http://www.ncsl.org/programs/health/genetics/ndishlth.htm>.

For more information, see the American Cancer Society's position statement on genetic testing or go to the National Cancer Institute site on genetic testing for breast cancer at <http://www.cancer.gov/cancertopics/genetic-testing-breast/>.

Family history of breast cancer: Breast cancer risk is higher among women whose close blood relatives have this disease. Your risk of developing breast cancer is increased if:

- You have 2 or more relatives with breast or ovarian cancer.
- Breast cancer occurs before age 50 in a relative (mother, sister, grandmother or aunt) on either side of the family. The risk is higher if your mother or sister has a history of breast cancer.
- You have relatives with both breast and ovarian cancer.
- You have 1 or more relatives with two cancers (breast and ovarian, or 2 different breast cancers).
- You have a male relative (or relatives) with breast cancer.
- You have a family history of breast or ovarian cancer and Ashkenazi Jewish heritage.
- Your family history includes a history of diseases associated with hereditary breast cancer such as Li-Fraumeni or Cowden Syndrome.

Having 1 first-degree relative (mother, sister, or daughter) with breast cancer approximately doubles a woman's risk. Having 2, first-degree relatives increases her risk 5-fold. Although the exact risk is not known, women with a family history of breast cancer in a father or brother also have an increased risk of breast cancer. Altogether, about 20% to 30% of women with breast cancer have a family member with this disease.

Personal history of breast cancer: A woman with cancer in one breast has a 3- to 4-fold increased risk of developing a new cancer in the other breast or in another part of the same breast. This is different from a **recurrence** (return) of the first cancer.

Race: White women are slightly more likely to develop breast cancer than are African-American women. African-American women are more likely to die of this cancer. Many experts now feel that the main reason for this is because African-American women have more aggressive tumors (see basal-like breast cancer, below). The reasons for this are not known. Asian, Hispanic, and Native-American women have a lower risk of developing and dying from breast cancer.

Benign breast disease: Women who have had benign breast disease diagnosed (usually by biopsy) have about a 50% increase in their chance of developing breast cancer. The risk is lowest for women with breast changes that are not associated with any overgrowth of breast tissue. It is higher if there are **proliferative changes** (called **hyperplasia**), meaning that there is excessive growth of cells in the ducts or lobules of the breast tissue. It is highest if these proliferative changes are associated with **atypia**, meaning the cells don't look quite right. Women with a family history of breast cancer and either hyperplasia or atypical hyperplasia have an even higher risk of developing a breast cancer.

Previous chest radiation: Women who as children or young adults had radiation therapy to the chest area as treatment for another cancer (such as Hodgkin disease or non-Hodgkin lymphoma) are at significantly increased risk for breast cancer. Some reports found the risk to be 12 times normal risk. This varies with the age of the patient

at the time of radiation. Younger patients have a higher risk. If chemotherapy was also given, the risk may be lowered if the chemotherapy stopped ovarian hormone production. The risk of developing breast cancer appears to be highest if the breast was still in development (during adolescence) when the radiation was given.

Menstrual periods: Women who started menstruating at an early age (before age 12) or who went through menopause at a late age (after age 55) have a slightly higher risk of breast cancer.

Diethylstilbestrol (DES): In the 1940s through the 1960s some pregnant women were given diethylstilbestrol because it was thought to lower their chances of losing the baby (miscarriage). Recent studies have shown that these women have a slightly increased risk of developing breast cancer. Recent findings have also suggested that women whose mothers took DES during pregnancy may have a higher risk for breast cancer than women not exposed to the drug in utero. For more information on DES see the American Cancer Society document, "DES Exposure: Questions and Answers."

Lifestyle-Related Factors and Breast Cancer Risk

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. Having multiple pregnancies and becoming pregnant at an early age reduces breast cancer risk.

Oral contraceptive use: It is still not certain what part oral contraceptives (birth control pills) might play in breast cancer risk. Studies have suggested that women now using oral contraceptives have a slightly greater risk of breast cancer than women who have never used them. 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.

Postmenopausal hormone therapy (also known as hormone replacement therapy, or HRT): It has become clear that long-term use (several years or more) of postmenopausal hormone therapy (PHT), particularly estrogen and progesterone combined, increases your risk of breast cancer. Long-term PHT use may also increase your chances of dying of breast cancer.

If you still have your uterus (womb), doctors generally prescribe estrogen and progesterone (known as combined PHT). Estrogen relieves menopausal symptoms and delays **osteoporosis** (thinning of the bones that can lead to fractures). But estrogen can increase the risk of developing cancer of the uterus. Progesterone is added to help prevent this.

If you no longer have your uterus, estrogen alone can be prescribed. This is commonly known as estrogen replacement therapy (ERT). This probably does not increase the risk of breast cancer very much, if at all, especially if used for a relatively short period of time.

Several large studies, including the Women's Health Initiative (WHI), have found that there is an increased risk of breast cancer related to the use of combined PHT. The most recent results from the WHI found that not only did combined PHT increase breast cancer risk, but it also increased the likelihood that the cancer would be found at a more advanced stage. This is because it appeared to reduce the effectiveness of mammograms, as more abnormal findings on mammograms were noted. A large study from the United Kingdom has now found that women who took the combined therapy were also more likely to die of breast cancer than women who didn't.

The risk of PHT appears to apply only to current and recent users, and a woman's breast cancer risk seems to return to that of the general population within 5 years of stopping PHT.

Estrogen alone (ERT) does not appear to increase the risk of developing breast cancer. But when used long term (for more than 10 years), ERT has been found to increase the risk of ovarian and breast cancer in some studies.

At this time there appear to be few strong reasons to use postmenopausal hormone therapy (combined PHT or ERT), other than possibly for the temporary relief of menopausal symptoms. In addition to the increased risk of breast cancer, the WHI found that combined PHT also increased the risk of heart disease, blood clots, and strokes,

and did not have a beneficial effect on mental function or preventing Alzheimer's disease. It did lower the risk of colorectal cancer and osteoporosis, but this must be weighed against the possible harms, and it should be considered that there are other effective ways to prevent osteoporosis. And, as noted above, while ERT did not seem to have much effect on the risk of breast cancer, it did increase the risk of stroke.

The decision to use PHT should be made by the woman and her doctor after weighing the possible risks (including increased risk of heart disease, breast cancer, strokes, and blood clots) and benefits (relief of menopausal symptoms, reduced risk of osteoporosis), and considering each woman's other risk factors for heart disease, breast cancer, osteoporosis, and the severity of her menopausal symptoms.

Breast-feeding and pregnancy: Some studies suggest that breast-feeding may slightly lower breast cancer risk, especially if breast-feeding is continued for 1.5 to 2 years. Other studies found no impact on breast cancer risk.

The explanation of this may be that both pregnancy and breast-feeding reduce a woman's total number of lifetime menstrual cycles. This may be similar to the reduction of risk due to late menarche (start of menstrual periods) or early menopause, which also decrease the total number of menstrual cycles. One study concluded that having more children and breast-feeding longer could reduce the risk of breast cancer by half.

Alcohol: Use of alcohol is clearly linked to an increased risk of developing breast cancer. The risk increases with the amount of alcohol consumed. Compared with nondrinkers, women who consume 1 alcoholic drink a day have a very small increase in risk. Those who have 2 to 5 drinks daily have about 1½ times the risk of women who drink no alcohol. Alcohol is also known to increase the risk of developing cancers of the mouth, throat, and esophagus. The American Cancer Society recommends limiting your consumption of alcohol.

Obesity and high-fat diets: Obesity (being overweight) has been found to be a breast cancer risk in all studies, especially for women after menopause. Although your ovaries produce most of your estrogen, fat tissue produces a small amount of estrogen. Having more fat tissue after menopause can increase your estrogen levels and, thereby, increase your likelihood of developing breast cancer.

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 is not increased among those who have been overweight since childhood. Also, excess fat in the waist area may affect 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 have not clearly shown that this is a breast cancer risk factor. 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, and genetic factors) that might also alter breast cancer risk.

More research is needed to better understand the effect of the types of fat eaten and body weight on breast cancer risk. But it is clear that calories do count and fat is a major source of these. A diet high in fat has also been shown to influence 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 you maintain a healthy weight throughout your life and limit your intake of processed and red meats.

Physical activity: Evidence is growing that physical activity in the form of exercise reduces breast cancer risk. The only question is how much exercise is needed. In one study from the Women's Health Initiative (WHI) as little as 1.25 to 2.5 hours per week of brisk walking reduced a woman's risk by 18%. Walking 10 hours a week reduced the risk a little more. The American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention recommend that you engage in 45 to 60 minutes of intentional physical activity 5 or more days a week.

Factors With Uncertain, Controversial, or Unproven Effect on Breast Cancer Risk

Antiperspirants: Internet e-mail rumors have suggested that chemicals in underarm antiperspirants are absorbed through the skin, interfere with lymph circulation, cause toxins to build up in the breast, and eventually lead to breast cancer. There is very little experimental or epidemiological evidence to support this rumor. Chemicals in products such as antiperspirants are tested thoroughly to ensure their safety. One small study recently found trace levels of parabens (used as preservatives in antiperspirants), which have weak estrogen-like properties, in a small sample of breast cancer tumors. However, the study did not look at whether parabens caused the tumors. This was a preliminary finding, and more research is needed to determine what effect, if any, parabens may have on breast cancer risk. On the other hand, a recent large study of breast cancer causes found no increase in breast cancer in women who used underarm antiperspirants or shaved their underarms.

Underwire bras: Internet e-mail rumors and at least one book have suggested that bras cause breast cancer by obstructing lymph flow. There is no scientific or clinical basis for this claim.

Induced abortion: Several studies have provided very strong data that induced abortions have no overall effect on the risk of breast cancer. Also, there is no evidence of a direct relationship between breast cancer and spontaneous abortion (miscarriage) in most of the studies that have been published. Scientists invited to participate in a conference on abortion and breast cancer by the National Cancer Institute (February 2003) concluded that there was no relationship. A recent report of 83,000 women with breast cancer found no link to a previous abortion, either spontaneous (stillbirth) or induced.

Breast implants: Several studies have found that breast implants do not increase breast cancer risk although silicone breast implants can cause scar tissue to form in the breast. Implants make it harder to see breast tissue on standard mammograms, but additional x-ray pictures called implant displacement views can be used to more completely examine the breast tissue.

Environmental pollution: A great deal of research has been reported and more is being done to understand environmental influences on breast cancer risk. The goal is to determine their possible relationships to breast cancer. Currently, research does not show a clear link between breast cancer risk and exposure to environmental pollutants, such as the pesticide DDE (chemically related to DDT), and PCBs (polychlorinated biphenyls).

Tobacco smoke: Most studies have found no link between active cigarette smoking and breast cancer. Though active smoking has been suggested to increase the risk of breast cancer in some studies, the issue remains controversial.

An issue that continues to be an active focus of scientific research is whether secondhand smoke may increase the risk of breast cancer. Both mainstream and secondhand smoke contain about 20 chemicals that, in high concentrations, cause breast cancer in rodents. Chemicals in tobacco smoke reach breast tissue and are found in breast milk.

The evidence regarding secondhand smoke and breast cancer risk in human studies is controversial, at least in part because the risk has not been shown to be increased in active smokers. One possible explanation for this is that tobacco smoke may have different effects on breast cancer risk in smokers and in those who are just exposed to smoke.

A report from the California Environmental Protection Agency in 2005 concluded that the evidence regarding secondhand smoke and breast cancer is "consistent with a causal association" in younger, mainly premenopausal women. The 2006 US Surgeon General's report, *The Health Consequences of Involuntary Exposure to Tobacco Smoke*, concluded that there is "suggestive but not sufficient" evidence of a link at this point. In any case, women should be told that this possible link to breast cancer is yet another reason to avoid contact with secondhand smoke.

Night work: Several studies have suggested that women who work at night, for example, nurses on a night shift, may have an increased risk of developing breast cancer. However, this increased risk has not yet been proven and more studies are in progress. According to some researchers, the effect may be due to disruption in melatonin, a

hormone that is affected by light, but other hormones are also being studied