Breast Cancer - Risk Factors [1]

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ON THIS PAGE: You will find out more about the factors that increase the chance of developing this type of cancer. To see other pages, use the menu on the side of your screen.

A risk factor is anything that increases a person?s chance of developing cancer. Although risk factors often influence the risk of developing of cancer, most do not directly cause cancer. Some people with several risk factors never develop cancer, while others with no known risk factors do. However, knowing your risk factors and talking about them with your doctor may help you make more informed lifestyle and health care choices.

A woman with an average risk of breast cancer has about a 12% chance of developing breast cancer within her lifetime. Generally, most breast cancers are sporadic, meaning they develop from damage to a person?s genes that occurs by chance after they are born, and there is no risk of passing this gene on to a person's children. Inherited breast cancers are less common, making up 5% to 10% of cancers, and occur when gene changes called mutations are passed down within a family from one generation to the next (see below).

When considering your breast cancer risk, it is important to remember that most women who develop breast cancer have no obvious risk factors and no family history of breast cancer. Multiple risk factors influence the development of breast cancer. This means that all women need to be aware of changes in their breasts and talk with their doctors about receiving regular breast examinations by a doctor and mammograms [3], which is an x-ray of the breast that can often detect a tumor that is too small to be felt.

The following factors may raise a woman?s risk of developing breast cancer:

Age. The risk of developing breast cancer increases as a woman ages, with most cancers developing in women older than 50.

Personal history of breast cancer. A woman who has had breast cancer in one breast has a 1% to 2% chance per year of developing a second breast cancer in her opposite breast, if she has no other risk factors. This risk may be reduced by treatment such as hormonal therapy for some women (see Treatment Options [4]).

Family history of breast cancer. Breast cancer may run in the family if first-degree relatives,

such as mothers, sisters, brothers, and children, or many close relatives (including grandparents, aunts and uncles, nieces and nephews, grandchildren, and cousins) have been diagnosed with breast cancer or ovarian cancer, especially before age 50. Breast cancer may also be likely to run in the family if the relative who developed breast cancer is a man, because this may be a sign that inherited genetic changes contributed to the risk of developing cancer (see below). Women with a first-degree relative who developed breast cancer have a risk that is about double an average woman's risk. If two first-degree relatives developed breast cancer, the risk is five times the average risk. It is uncertain how much a woman's risk of breast cancer is increased when a man in the family has breast cancer, unless this is due to an inherited mutation. If a man within your family has developed breast cancer or a woman has developed breast cancer at an early age or has as developed ovarian cancer, it is important to talk with your doctor, as this could be a sign that your family carries an inherited breast cancer gene, such as *BRCA1* or *BRCA2* (see below).

When looking at family history, it?s also important to consider your father?s side of the family as this is equally important as your mother?s side in determining your personal risk for developing breast cancer.

Inherited risk/Genetic predisposition. There are several inherited genes linked with an increased risk of breast cancer, as well as other types of cancer. The most common are breast cancer genes 1 or 2. These are commonly shortened to *BRCA1* or *BRCA2*. Mutations on these genes are linked to an increased risk of breast and ovarian cancer, as well as other types of cancer. A man?s risk of breast cancer [5], as well as the risk for prostate cancer, is also increased if he has mutations on these genes. Learn more about hereditary breast and ovarian cancer in a one-page fact sheet [6] (available as a PDF) or in a more detailed guide [7].

Other gene mutations or hereditary conditions that can increase a person?s risk of breast cancer, including ataxia telangiectasia (A-T) [8], Li-Fraumeni syndrome (LFS) [9], Cowden syndrome (CS) [10], Peutz-Jeghers syndrome (PJS) [11], and Lynch syndrome [12]. There are also other genes that may cause an increased risk of breast cancer. However, more research is needed to understand how they increase a person?s risk and to find other genes that affect breast cancer risk.

Genetic testing [13] through blood tests is available to test for known mutations in *BRCA 1* and *BRCA 2* genes and other hereditary syndromes, but these tests are not recommended for everyone and are recommended **only after** a person has received appropriate genetic counseling [14]. If a woman learns she has one of these genetic mutations, there are steps she can take to lower her risk of breast and ovarian cancers, and she may need a different breast cancer screening schedule than the general population, such as having tests more often or starting screening at a younger age.

Personal history of ovarian cancer. A history of ovarian cancer can increase a woman?s risk of breast cancer, if the ovarian cancer was because of an inherited mutation. Breast cancer gene mutations, such as *BRCA1* or *BRCA2,* greatly increase the risk of both ovarian and breast cancers [7].

Estrogen and progesterone exposure. Estrogen and progesterone are hormones in women that control the development of secondary sex characteristics, such as breast development, and

pregnancy. A woman?s production of estrogen and progesterone decreases with age, with a steep decrease around menopause. Long-term exposure to these hormones increases breast cancer risk.

- Women who began menstruating before ages 11 or 12 or went through menopause after age 55 have a somewhat higher risk of breast cancer because their breast cells have been exposed to estrogen and progesterone for a longer time.
- Women who had their first pregnancy after age 35 or who have never had a full-term pregnancy have a higher risk of breast cancer. Pregnancy may help protect against breast cancer because it pushes breast cells into their final phase of maturation.

Hormone replacement therapy after menopause. Using hormone therapy with both estrogen and progesterone after menopause, often called postmenopausal hormone therapy or replacement, within the past five years or for several years increases a woman?s risk of breast cancer. In fact, the number of new breast cancers diagnosed has dropped as fewer women have been taking postmenopausal hormone therapy. However, women who have taken estrogen alone, without previously receiving progesterone, for up to five years because they have had their uterus removed for other reasons appear to have a slightly lower risk of breast cancer.

Oral contraceptives or birth control pills. Some studies suggest that oral contraceptives slightly increase the risk of breast cancer, while others have shown no link between the use of oral contraceptives to prevent pregnancy and development of breast cancer. Research on this topic is ongoing.

Race and ethnicity. Breast cancer is the most common cancer diagnosis in women, other than skin cancer, regardless of race. White women are more likely to develop breast cancer than black women, but among women younger than 44, the disease is more common in black women than in young white women. Black women are also more likely to die from the disease. Reasons for survival differences include differences in biology, other health conditions, and socioeconomic factors affecting access to medical care. Women of Ashkenazi Jewish heritage also have an increased risk of breast cancer because they are more likely to have *BRCA* gene mutations. Breast cancer is least commonly diagnosed in Hispanic, Asian/Pacific Islander, and American Indian/Alaska Native women. Both black and Hispanic women are more likely to be diagnosed with larger tumors and later-stage cancer than white women. However, Hispanic women generally have better survival rates than white women. Breast cancer diagnoses have been increasing in second generation Asian/Pacific islander and Hispanic women for unclear reasons, but likely related to changes in diet and lifestyle associated with living in the United States.

Atypical hyperplasia of the breast. This diagnosis increases the risk of developing breast cancer in the future and is characterized by abnormal, but not cancerous, cells found in a biopsy of the breast.

LCIS. As explained in the Overview [15] section, this diagnosis refers to abnormal cells found in the lobules or glands of the breast. LCIS in one breast increases the risk of developing invasive breast cancer in either breast in the future. Invasive cancer is cancer that spreads into surrounding tissues. If LCIS is found during a biopsy (see Diagnosis [16]), it may be removed to check for other changes, and additional treatment may be recommended. Talk with your doctor about the best way to monitor this condition.

Lifestyle factors. As with other types of cancer, studies continue to show that various lifestyle factors may contribute to the development of breast cancer.

- Weight [17]. Recent studies have shown that postmenopausal women who are overweight or obese have an increased risk of breast cancer, and they have a higher risk of having the cancer come back after treatment.
- Physical activity. Increased physical activity is associated with a decreased risk of developing breast cancer and a lower risk of having the cancer come back after treatment. Regular physical activity may protect against breast cancer by helping women maintain a healthy body weight, lowering hormone levels, or causing changes in a women?s metabolism or immune factors.
- Alcohol. Current research suggests that having more than one to two alcoholic drinks, including beer, wine, and spirits, per day raises the risk of breast cancer, as well as the risk of having the cancer come back after treatment.
- Food. There is no reliable research that confirms that eating or avoiding specific foods reduces the risk of developing breast cancer or having the cancer come back after treatment. However, eating more fruits and vegetables and fewer animal fats is linked with many health benefits.

Socioeconomic factors. More affluent women in all race and ethnic groups have a higher risk of developing breast cancer than less-affluent women in the same groups. Although the reasons for this difference are not known, it is thought to be due to variations in diet, environmental exposures, and other risk factors such as breast density. In contrast, women living in poverty are more likely to be diagnosed at an advanced stage and are less likely to survive their disease than more affluent women. This is likely due multiple factors, including lifestyle factors, other health conditions such as obesity, and tumor biology, with access to healthcare playing an additional role.

Radiation. High doses of ionizing radiation, such as from tanning booths and x-rays, may increase a woman?s risk of breast cancer. Radiation to the chest given at a young age, such as that given for treatment for a childhood cancer, also increases the risk of breast cancer. However, the very small amount of radiation a woman receives during a yearly mammogram has not been linked to an increased risk of breast cancer.

Breast density. Dense breast tissue may make it more difficult to find tumors on standard imaging tests, such as a mammography (see Diagnosis [16]). Breast density may be a result of higher levels of estrogen, rather than a separate risk factor, and usually decreases with age. Some states are beginning to require that results from mammograms include information about breast density, if the results show a woman has dense breast tissue. Researchers are looking at whether lowering breast density might also decrease the risk of breast cancer.

Understanding your risk of breast cancer

Several breast cancer risk assessment tools have been developed to help a woman estimate her chance of developing breast cancer. The best studied is the Gail model (found on the National Cancer Institute?s website at www.cancer.gov/bcrisktool [18]). After you enter some personal and family information, including race/ethnicity, the tool provides you with a five-year and lifetime estimate of the risk of developing invasive breast cancer. Because it only asks for information about breast cancer in first-degree family members and doesn?t include their age at diagnosis, the tool works best at estimating risk in women without a strong inherited breast cancer risk. For some women, other ways of determining the risk of breast cancer may work better. It?s important to talk with your doctor about how to find out your personal risk of breast cancer.

Lowering your risk of breast cancer

Researchers continue to look into what factors cause breast cancer and what people can do to lower their personal risk. There is no proven way to completely prevent this disease, but there may be steps you can take to lower your risk. Talk with your doctor if you have concerns about your personal risk of developing breast cancer.

Mastectomy. For women with *BRCA1* or *BRCA2* mutations, the preventive removal of the breasts through a procedure called a prophylactic mastectomy may be considered. This appears to reduce the risk of developing breast cancer by at least 95%. Women with these mutations may also consider the preventive removal of the ovaries and fallopian tubes, called a prophylactic salpingo-oophorectomy. This procedure can reduce the risk of developing ovarian cancer, as well as breast cancer by stopping the ovaries from making estrogen. Talk with your doctor about potential side effects when considering having these procedures.

Chemoprevention. Women who have a higher than normal risk of developing breast cancer may consider chemoprevention. Chemoprevention is the use of drugs to reduce cancer risk. Two drugs, tamoxifen (Nolvadex, Soltamox) and raloxifene (Evista), are approved to lower breast cancer risk. These drugs are called selective estrogen receptor modulators (SERMs). A SERM is a medication that blocks estrogen receptors in some tissues and not others. Postmenopausal women and premenopausal women may take tamoxifen, whereas raloxifene is only approved for postmenopausal women. Each drug also has different side effects. Talk with your doctor about whether you may benefit from chemoprevention for breast cancer. Aromatase inhibitors (AIs) are also being looked at to reduce breast cancer risk. AIs are a type of hormonal treatment that reduces the amount of estrogen in a woman's body by stopping tissues and organs other than the ovaries from producing estrogen. One AI called exemestane (Aromasin) has shown promise in reducing breast cancer risk. However, AIs can only be used in women who have gone through menopause, and exemestane is not yet approved by the U.S. Food and Drug Administration

(FDA) for lowering breast cancer risk in women who do not have the disease. Read more about drugs to reduce breast cancer risk [19].

Other drugs being looked at to reduce breast cancer risk include statins and metformin (multiple brand names), a drug commonly used for diabetes.

Lifestyle choices. Other ways to lower your risk of breast cancer include getting regular physical activity, staying at a healthy weight, limiting the amount of alcohol you drink, and limiting the use of post-menopausal hormone therapy. Learn about more lifestyle choices that may help lower your risk of breast cancer [20].

Screening guidelines

Mammography [3] is the best tool doctors have to screen healthy women for breast cancer, as it has been shown to lower deaths from breast cancer. Like any medical test, mammography involves risks, such as additional testing and anxiety if the test falsely shows a suspicious finding; this is called a false-positive. Up to 10% to 15% of the time, mammography will not see an existing cancer, called a false-negative result. Digital mammography may be better able to find cancers, particularly in women with dense breasts. A new type of mammogram, called tomosynthesis or 3D mammography, when combined with standard mammograms may improve the ability to find small cancers and reduce the need to repeat tests due to false positives.

Different organizations have looked at the evidence, risks, and benefits of mammography and have developed different screening recommendations:

- The U.S. Preventive Services Task Force (USPSTF) recommends that women ages 50 to 74 have mammography every two years. They recommend that mammography be considered in women ages 40 to 49 after evaluating the risks and benefits of this test with a doctor.
- The American Cancer Society (ACS) recommends yearly mammography beginning at age 40.

The controversy about screening mammography is related to the ability of early detection to lower the number of deaths from breast cancer. Breast cancers detected by mammography are often small, with a low risk of recurrence. In contrast, rapidly growing, aggressive cancers are more commonly found in between screening mammograms, are associated with worse chance of recovery, and are more frequently found in young women.

All women should talk with their doctors about mammography and decide on an appropriate screening schedule. For women at high risk for developing breast cancer, screening is recommended at an earlier age and more often than the schedules listed above.

The USPSTF and ACS also differ on their recommendations for clinical breast examinations. The USPSTF recommends a clinical breast examination along with mammography. The ACS recommends a clinical breast examination every one to three years until age 40, then annually.

Finally, although breast self-examination has not been shown to lower deaths from breast cancer, it is important for women to become familiar with their breasts so that they can be aware of any changes and report these to their doctor. Cancers that are growing more quickly are often found by breast examination between regular mammograms.

Other ways to examine the breasts, such as ultrasound and magnetic resonance imaging (MRI), are not regularly used to screen for breast cancer. These tests may be helpful for women with a higher risk of breast cancer or when a lump or mass is found during a breast examination. According to the ACS, women with *BRCA* gene mutations, a strong family history of breast cancer, or precancerous changes on a biopsy have a higher risk of developing breast cancer and should receive regular MRI screening and mammography, usually in an alternating schedule. MRI may be better than mammography and ultrasound at finding a small mass in a woman?s breast, especially for women with very dense breast tissue. However, an MRI has a higher rate of false-positive test results, which may mean more biopsies, surgeries, and other tests. In addition, an MRI does not show tiny spots of calcium called calcifications that can be found on an x-ray. Calcifications are a sign of in situ breast cancer (DCIS).

Ultrasound or MRI may also be used for women with a suspicious breast finding on physical examination or mammography. If a lump or mass is found during a physical examination, further testing is needed, even if the mammogram is reported to be normal. Women are encouraged to talk with their doctor about the method of screening recommended for them and how often screening is needed.

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