



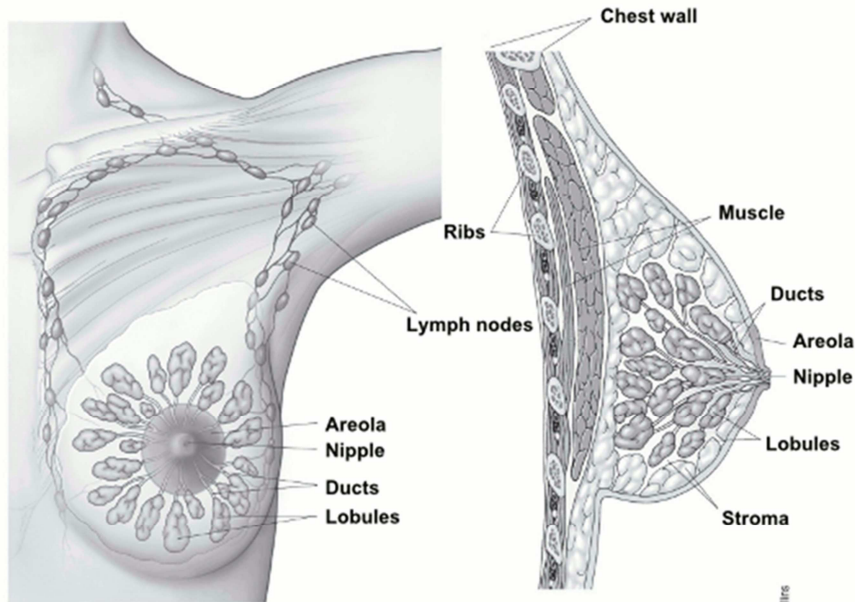
Breast Cancer Prevention and Early Detection

What is breast cancer

Breast cancer is a malignant tumor that starts in the cells of the breast. A malignant tumor is a group of cancer cells that can grow into (invade) nearby tissues or spread (metastasize) to distant parts of the body. Breast cancer happens mostly in women, but men can get it, too.

The normal breast

To understand breast cancer, it helps to know about the normal structure of the breasts.



Normal breast tissue

The female breast is made up mainly of:

- Lobules – milk-producing glands
- Ducts – tiny tubes that carry the milk from the lobules to the nipple
- Stroma – fatty tissue and connective tissue, blood vessels, and lymphatic vessels

Most breast cancers start in the cells that line the ducts (*ductal* cancers). Some start in the cells that line the lobules (*lobular* cancers), while a small number start in other tissues.

What are the risk factors for breast cancer?

A risk factor is anything that affects your chance of getting a disease such as cancer. Most women who have one or more breast cancer risk factors never develop breast cancer, while many women with breast cancer have no known risk factors (other than being a woman and growing older). Even when a woman with risk factors develops breast cancer, it's hard to know just how much these factors might have contributed.

Some risk factors can't be changed – like a person's age or race. Other risk factors are lifestyle-related, such as cancer-causing factors in the environment or personal behaviors, 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 things like aging or lifestyle.

You may also hear about risk factors with unclear effects on breast cancer risk, or risk factors that are controversial or have been disproven.

Breast cancer risk factors you cannot change

Gender

Simply being a woman is the main risk factor for developing breast cancer. Men can develop breast cancer, but it's about 100 times more common among women than men. This is probably because men have less breast tissue, as well as less of the female hormones estrogen and progesterone, which can promote breast cancer cell growth.

Aging

Your risk of developing breast cancer goes up as you get older. About 1 out of 8 invasive breast cancers are found in women younger than 45, while about 2 of 3 invasive breast cancers are found in women age 55 or older.

Inheriting certain genes

About 5% to 10% of breast cancer cases are thought to be hereditary, meaning that they are caused by gene defects (called *mutations*) passed on from a parent.

***BRCA1* and *BRCA2* gene changes:** The most common cause of hereditary breast cancer is an inherited mutation in the *BRCA1* or *BRCA2* gene. In normal cells, these genes help prevent cancer by making proteins that help keep the cells from growing out of control. If you inherited a mutated copy of either gene from a parent, you have a high risk of developing breast cancer during your lifetime.

Although in some families with *BRCA1* mutations the lifetime risk of breast cancer is as high as 80%, on average this risk seems to be in the range of 55 to 65%. For *BRCA2* mutations the risk is lower, around 45%.

Breast cancers linked to these mutations occur more often in younger women and more often affect both breasts than cancers not linked to these mutations. Women with these inherited mutations also have an increased risk for developing other cancers, particularly ovarian cancer.

In the United States, *BRCA* mutations are more common in Jewish people of Ashkenazi (Eastern Europe) origin than in other racial and ethnic groups, but they can occur in anyone.

Changes in other genes: Other inherited gene mutations can also lead to breast cancer. These gene mutations are much less common and often do not increase the risk of breast cancer as much as the *BRCA* genes.

- *ATM*: The *ATM* gene makes a protein that normally helps repair damaged DNA. Inheriting 2 abnormal copies of this gene (one from each parent) causes the disease *ataxia-telangiectasia*. Inheriting one abnormal copy of this gene has been linked to a high rate of breast cancer in some families.
- *TP53*: The TP53 gene makes a protein called *p53* that helps stop the growth of abnormal cells. Inherited mutations of this gene cause *Li-Fraumeni syndrome*. People with this syndrome have an increased risk of breast cancer, as well as other cancers such as leukemia, brain tumors, and sarcomas (cancers of bones or connective tissue). This is a rare cause of breast cancer.
- *CHEK2*: The Li-Fraumeni syndrome can also be caused by inherited mutations in the *CHEK2* gene. Even when it doesn't cause this syndrome, it can increase breast cancer risk when it's mutated.
- *PTEN*: The *PTEN* gene normally helps regulate cell growth. Inherited mutations in this gene cause *Cowden syndrome*, a rare disorder in which people are at increased risk for both benign and malignant breast tumors, as well as growths in the digestive tract, thyroid, uterus, and ovaries. Defects in this gene can also cause a different syndrome called *Bannayan-Riley-Ruvalcaba syndrome* that's not thought to be linked to breast cancer risk. The syndromes caused by mutations in *PTEN* can be grouped together as PTEN Tumor Hamartoma Syndrome.
- *CDH1*: Inherited mutations in this gene cause *hereditary diffuse gastric cancer*, a syndrome in which people develop a rare type of stomach cancer at an early age. Women with mutations in this gene also have an increased risk of invasive lobular breast cancer.
- *STK11*: Defects in this gene can lead to *Peutz-Jeghers syndrome*. People affected with this disorder develop pigmented spots on their lips and in their mouths, polyps in the urinary and gastrointestinal tracts, and have an increased risk of many types of cancer, including breast cancer.
- *PALB2*: The *PALB2* gene makes a protein that interacts with the protein made by the *BRCA2* gene. Defects in this gene can lead to an increased risk of breast cancer. It isn't yet clear if *PALB2* gene mutations also increase the risk for ovarian cancer and male breast cancer.

Genetic testing: Genetic testing can be done to look for mutations in the *BRCA1* and *BRCA2* genes (or less commonly in other genes such as *PTEN* or *TP53*). Although testing can be helpful in some situations, the pros and cons need to be considered carefully.

If you are thinking about genetic testing, it's strongly recommended that first you talk to a genetic counselor, nurse, or doctor qualified to explain and interpret the results of these tests. It's very important to understand what genetic testing can and can't tell you, and to

carefully weigh the benefits and risks of genetic testing before these tests are done. Testing is expensive and might not be covered by some health insurance plans.

For more information, see *Genetic Testing: What You Need to Know*. You might also want to visit the National Cancer Institute website.

Family history of breast cancer

Breast cancer risk is higher among women whose close blood relatives have this disease.

Having a first-degree relative (mother, sister, or daughter) with breast cancer about doubles a woman's risk. Having 2 first-degree relatives increases her risk about 3-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.

Overall, less than 15% of women with breast cancer have a family member with this disease. This means that most (85%) women who get breast cancer *do not* have a family history of this disease.

Personal history of breast cancer

A woman with cancer in one breast has an 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.) This risk is even higher if breast cancer was diagnosed at a younger age.

Race and ethnicity

Overall, white women are slightly more likely to develop breast cancer than are African-American women, but African-American women are more likely to die of this cancer. In women under 45 years of age, however, breast cancer is more common in African-American women. Asian, Hispanic, and Native American women have a lower risk of developing and dying from breast cancer.

Dense breast tissue

Breasts are made up of fatty tissue, fibrous tissue, and glandular tissue. A woman is said to have dense breasts (on a mammogram) when she has more glandular and fibrous tissue and less fatty tissue. Women with dense breasts on a mammogram have a risk of breast cancer that is 1.2 to 2 times that of women with average breast density. Unfortunately, dense breast tissue can also make mammograms less accurate.

A number of factors can affect breast density, such as age, menopausal status, the use of certain drugs (including menopausal hormone therapy), pregnancy, and genetics.

Certain benign breast conditions

Women diagnosed with certain benign breast conditions may have an increased risk of breast cancer. Some of these conditions are more closely linked to breast cancer risk than others. Doctors often divide benign breast conditions into 3 general groups, depending on how they affect this risk.

Non-proliferative lesions: These are not associated with overgrowth of breast tissue. They do not seem to affect breast cancer risk, or if they do, it's to a very small extent. They include:

- Fibrosis and/or simple cysts (sometimes called *fibrocystic changes* or *disease*)
- Mild hyperplasia
- Adenosis (non-sclerosing)
- Phyllodes tumor (benign)
- A single papilloma
- Fat necrosis
- Duct ectasia
- Periductal fibrosis
- Squamous and apocrine metaplasia
- Epithelial-related calcifications
- Other benign tumors (such as lipoma, hamartoma, hemangioma, neurofibroma, adenomyoepithelioma)

Mastitis (infection of the breast) is not a lesion, and it doesn't increase the risk of breast cancer.

Proliferative lesions without atypia: These conditions show excessive growth of cells in the ducts or lobules of the breast tissue. They seem to raise a woman's risk of breast cancer slightly (1½ to 2 times normal). They include:

- Usual ductal hyperplasia (without atypia)
- Fibroadenoma
- Sclerosing adenosis
- Several papillomas (called *papillomatosis*)

- Radial scar

Proliferative lesions with atypia: In these conditions, there's excessive growth of cells in the ducts or lobules of the breast tissue, and some of the cells do not look normal. These have a stronger effect on breast cancer risk, raising it about 4 to 5 times higher than normal. These types of lesions include:

- Atypical ductal hyperplasia (ADH)
- Atypical lobular hyperplasia (ALH)

Women with a family history of breast cancer and either hyperplasia or atypical hyperplasia have an even higher risk of developing a breast cancer.

For more information on these conditions, see *Non-cancerous Breast Conditions*.

Lobular carcinoma in situ

In lobular carcinoma in situ (LCIS), cells that look like cancer cells are growing in the lobules of the milk-producing glands of the breast, but they have not grown through the wall of the lobules. LCIS (also called *lobular neoplasia*) is sometimes grouped with ductal carcinoma in situ (DCIS) as a non-invasive breast cancer, but it differs from DCIS in that it doesn't seem to become invasive cancer if it isn't treated.

Women with LCIS have a 7- to 11-fold increased risk of developing cancer in either breast.

Starting menstruation before age 12

Women who have had more menstrual cycles (periods) because they started menstruating early (before age 12) have a slightly higher risk of breast cancer. The increase in risk may be due to a longer lifetime exposure to the hormones estrogen and progesterone.

Going through menopause after age 55

Women who have had more menstrual cycles because they went through menopause later (after age 55) have a slightly higher risk of breast cancer. The increase in risk may be due to a longer lifetime exposure to the hormones estrogen and progesterone.

Previous chest radiation

Women who as children or young adults were treated with radiation therapy to the chest area for another cancer (such as Hodgkin disease or non-Hodgkin lymphoma) have an increased breast cancer risk. This varies with the patient's age when they got radiation. The risk is highest if the radiation was given during adolescence, when the breasts were

still developing. Radiation treatment after age 40 does not seem to increase breast cancer risk.

Diethylstilbestrol (DES) exposure

From the 1940s through the early 1970s some pregnant women were given DES, an estrogen-like drug, because it was thought to lower their chances of losing the baby (miscarriage). These women have a slightly increased risk of developing breast cancer. Women whose mothers took DES during pregnancy may also have a slightly higher risk of breast cancer. For more information, see *DES Exposure: Questions and Answers*.

Lifestyle-related risk factors for breast cancer

Drinking alcohol

Drinking alcohol is clearly linked to an increased risk of breast cancer. The risk increases with the amount of alcohol consumed. Excessive alcohol consumption is also known to increase the risk of developing several other cancers.

Being overweight or obese

Being overweight or obese after menopause increases breast cancer risk. Before menopause your ovaries make most of your estrogen, and fat tissue makes a small amount. After menopause (when the ovaries stop making estrogen), most of a woman's estrogen comes from fat tissue. Having more fat tissue after menopause can increase your chance of getting breast cancer by raising estrogen levels. Also, women who are overweight tend to have higher blood insulin levels. Higher insulin levels have also been linked to some cancers, including breast cancer.

The connection between weight and breast cancer risk is complex. For instance, risk appears to be increased for women who gained weight as an adult but may not be increased in 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 that may explain this.

Physical activity

Evidence is growing that physical activity in the form of exercise reduces breast cancer risk. The main question is how much exercise is needed. In one study from the Women's Health Initiative, as little as 1¼ to 2½ hours per week of brisk walking reduced a woman's risk by 18%. Walking 10 hours a week reduced the risk a little more.

Having children

Women who have not had children or who had their first child after age 30 have a slightly higher breast cancer risk overall. Having many pregnancies and becoming pregnant at an early age reduces breast cancer risk overall. Still, the effect of pregnancy is different for different types of breast cancer.

Birth control

Oral contraceptives: Studies have found that women using oral contraceptives (birth control pills) have a slightly greater risk of breast cancer than women who have never used them. This risk seems to go back to normal over time once the pills are stopped. Women who stopped using oral contraceptives more than 10 years ago don't appear to have any increased breast cancer risk.

Depot-medroxyprogesterone acetate (DMPA; Depo-Provera): This is an injectable form of progesterone that is given once every 3 months as birth control. A few studies have looked at the effect of DMPA on breast cancer risk. Women currently using DMPA seem to have an increase in risk, but the risk doesn't seem to be increased if this drug was used more than 5 years ago.

Hormone therapy after menopause

Hormone therapy with estrogen (often combined with progesterone) has been used for many years to help relieve symptoms of menopause and to help prevent osteoporosis (thinning of the bones). This treatment goes by many names, such as *post-menopausal hormone therapy* (PHT), *hormone replacement therapy* (HRT), and *menopausal hormone therapy* (MHT).

There are 2 main types of hormone therapy:

- For women who still have a uterus (womb), doctors generally prescribe estrogen and progesterone (known as *combined hormone therapy* or HT). Progesterone is needed because estrogen alone can increase the risk of cancer of the uterus.
- For women who've had a hysterectomy (those who no longer have a uterus), estrogen alone can be prescribed. This is commonly known as *estrogen replacement therapy* (ERT) or just *estrogen therapy* (ET).

Combined hormone therapy (HT): Use of combined hormone therapy increases the risk of getting breast cancer. It may also increase the chances of dying from breast cancer.

Estrogen therapy (ET): The use of estrogen alone after menopause does not appear to increase the risk of developing breast cancer.

For more information about this topic, see *Menopausal Hormone Therapy and Cancer Risk*.

Breastfeeding

Some studies suggest that breastfeeding may slightly lower breast cancer risk, especially if it's done for at least a year. But this has been hard to study, especially in countries like the United States, where breastfeeding for this long is uncommon.

The reason for this possible effect may be that breastfeeding reduces a woman's total number of lifetime menstrual cycles (the same as starting menstrual periods at a later age or going through early menopause).

Factors with unclear effects on breast cancer risk

For some factors, the research is not yet clear on whether they influence breast cancer risk.

Diet and vitamin intake

Many studies have looked for a link between certain diets and breast cancer risk, but so far the results have been conflicting. Some studies have shown that diet may play a role, while others have not found that diet impacts breast cancer risk.

Studies have also looked at vitamin levels, again with mixed results. Some studies have actually found an increased risk of breast cancer in women with higher levels of certain nutrients. So far, no study has shown that taking vitamins reduces breast cancer risk.

Most studies have 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. But many studies of women in the United States have not linked breast cancer risk to fat in the diet. Researchers are still not sure how to explain this. It may be at least partly due to the effect of diet on body weight. Also, 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 on breast cancer risk. But it's clear that calories do count, and fat is a major source of calories. High-fat diets can lead to being overweight or obese, which is a breast cancer risk factor. 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.

Chemicals in the environment

A great deal of research has been reported and more is being done to understand possible environmental influences on breast cancer risk.

Chemicals in the environment that have estrogen-like properties are of special interest. For example, substances found in some plastics, certain cosmetics and personal care products, pesticides, and PCBs (polychlorinated biphenyls) seem to have such properties. These could in theory affect breast cancer risk.

This issue understandably invokes a great deal of public concern, but at this time research does not show a clear link between breast cancer risk and exposure to these substances. Unfortunately, studying such effects in humans is difficult. More research is needed to better define the possible health effects of these and similar substances.

Tobacco smoke

In recent years, some studies have found that long-term heavy smoking might be linked to a higher risk of breast cancer. Some studies have found that the risk is highest in certain groups, such as women who started smoking before they had their first child. The 2014 US Surgeon General's report on smoking concluded that there is "suggestive but not sufficient" evidence that smoking increases the risk of breast cancer.

Secondhand smoke: An active focus of research is whether secondhand smoke increases the risk of breast cancer. Both mainstream and secondhand smoke contain 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 on secondhand smoke and breast cancer risk in human studies is unclear, at least in part because the link between smoking and breast cancer is also not clear. One possible explanation for this is that tobacco smoke may have different effects on breast cancer risk in smokers compared to those who are just exposed to secondhand smoke.

A report from the California Environmental Protection Agency in 2005 concluded that the evidence about secondhand smoke and breast cancer is "consistent with a causal association" in younger, mainly pre-menopausal women. The 2014 US Surgeon General's report concluded that there is "suggestive but not sufficient" evidence of a link at this point. In any case, this possible link to breast cancer is yet another reason to avoid secondhand smoke.

Night work

Several studies have suggested that women who work at night may have an increased risk of breast cancer. This is a fairly recent finding, and more studies are looking at this issue. Some researchers think the effect may be due to changes in levels of melatonin, a

hormone whose production is affected by the body's exposure to light. Other hormones are also being studied.

Disproven or controversial breast cancer risk factors

There are many factors that research has shown are not linked to breast cancer. You may see information online or hear about these disproven or controversial risk factors, but it's important to learn the facts.

Antiperspirants

Internet and e-mail rumors have suggested that chemicals in underarm antiperspirants are absorbed through the skin, interfere with lymph circulation, and cause toxins to build up in the breast, over time leading to breast cancer.

Based on the available evidence (including what we know about how the body works), there's little if any reason to believe that antiperspirants increase the risk of breast cancer. For more information, see *Antiperspirants and Breast Cancer Risk*.

Bras

Internet and e-mail rumors and at least one book have suggested that bras cause breast cancer by blocking lymph flow. There's no good scientific or clinical basis for this claim, and a recent study of more than 1,500 women found no link between wearing a bra and breast cancer risk.

Induced abortion

Several studies have provided very strong data that neither induced abortions nor spontaneous abortions (miscarriages) have an overall effect on the risk of breast cancer. For more detailed information, see *Is Abortion Linked to Breast Cancer?*

Breast implants

Several studies have found that breast implants do not increase the risk of breast cancer. Implants can make breast tissue harder to see on standard mammograms, but extra x-ray pictures called *implant displacement views* can be used to examine the breast tissue more completely.

Breast implants might be linked to a rare type of lymphoma called *anaplastic large cell lymphoma*. This lymphoma has rarely been found in the breast tissue around the implants. So far, though, there are too few cases to know if the risk of this lymphoma is really higher in women with implants.

Can breast cancer be prevented?

There is no sure way to prevent breast cancer. But there are things all women can do to help reduce their risk and help increase the odds that if cancer does occur, it will be found at an early, more treatable stage.

Lowering your risk

You can lower your risk of breast cancer by changing those risk factors that can be changed. (See “[What are the risk factors for breast cancer?](#)”)

[Body weight](#), [physical activity](#), and [diet](#) have all been linked to breast cancer, so these might be areas where you can take action.

Both increased body weight and weight gain as an adult are linked with a higher risk of breast cancer after menopause. [Alcohol](#) also increases risk of breast cancer. Even low levels of alcohol intake have been linked with an increase in risk.

Many studies have shown that moderate to vigorous physical activity is linked with lower breast cancer risk.

A diet that’s rich in vegetables, fruit, poultry, fish, and low-fat dairy products has also been linked with a lower risk of breast cancer in some studies. But it’s not clear if specific vegetables, fruits, or other foods can lower risk. Most studies have not found that lowering fat intake has much of an effect on breast cancer risk.

At this time, the best advice about diet and activity to possibly reduce the risk of breast cancer is to:

- Get regular, intentional physical activity. To help reduce your risk of breast cancer, the American Cancer Society recommends that adults get at least 150 minutes of moderate intensity or 75 minutes of vigorous intensity activity each week (or a combination of these), preferably spread throughout the week.
- Reduce your lifetime weight gain by limiting your calories and getting regular physical activity.
- Avoid or limit your alcohol intake. The American Cancer Society recommends that women have no more than 1 alcoholic drink a day.

For more, see [American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention](#).

Women who choose to breastfeed for at least several months may also get an added benefit of reducing their breast cancer risk.

Not using [hormone therapy after menopause](#) can help you avoid raising your risk.

It's not clear at this time if environmental chemicals that have estrogen-like properties (like those found in some plastic bottles or certain cosmetics and personal care products) increase breast cancer risk. If there is an increased risk, it's likely to be very small. Still, women who are concerned may choose to avoid products that contain these substances when possible.

For women who are or may be at increased risk

If you are a woman at increased risk for breast cancer (for instance, because you have a strong family history of breast cancer, a known genetic mutation of a *BRCA* gene (*BRCA1* or *BRCA2*), or you have had DCIS, LCIS, or biopsies that have shown pre-cancerous changes), there may be some things you can do to help reduce your chances of developing breast cancer. Before deciding which, if any, of these may be right for you, talk with your health care provider to understand your risk and how much any of these approaches might lower this risk.

Genetic testing for *BRCA* gene mutations

Having an inherited mutation in one of the *BRCA* genes greatly increases a woman's risk of getting breast cancer (and some other cancers). Many women may have relatives with breast cancer, but in most cases this is not the result of *BRCA* gene mutations. Genetic testing for these mutations can be expensive, and the results are often not clear cut. Testing can have a wide range of consequences that need to be considered. It should only be done when there's a reasonable suspicion that a mutation may be present.

Different expert groups have different recommendations about who should be considered for genetic testing.

For example, the US Preventive Services Task Force (USPSTF) has guidelines aimed at women without a history of cancer. The USPSTF recommends that women with an increased risk of having a *BRCA* mutation based on a family history of breast, ovarian, fallopian tube, and/or primary peritoneal cancer should be referred to a genetics professional. The genetics professional can evaluate that risk further, discuss the pros and cons of testing if the woman is at high risk (this is called genetic counseling), and arrange for the test if the patient wishes to proceed. It's important to know that *BRCA* mutations are rare, and only a small fraction of women who have a family history of breast cancer should be referred for genetic counseling and testing.

Other medical groups offer guidelines that include women with cancer. For example, the National Comprehensive Cancer Network (NCCN) guidelines advise referring women 60 and under who have triple-negative breast cancer for genetic counseling and testing.

If you are considering genetic testing, it's strongly recommended that you talk first to a genetic counselor, nurse, or doctor qualified to explain and interpret the results of these tests. It's very important to understand what genetic testing can and can't tell you, and to

carefully weigh the benefits and risks of testing before these tests are done. You also need to know that testing is expensive and may not be covered by some health insurance plans.

Most large cancer centers employ a genetic counselor who can assess your risk of carrying a mutated *BRCA* gene, explain the risks and benefits of testing, and check with your insurance company to see if they will cover the test.

For more information, see [Genetic Testing: What You Need to Know](#). You might also want to visit the [National Cancer Institute website](#).

Breast cancer chemoprevention

Chemoprevention is the use of drugs to reduce the risk of cancer.

The drugs tamoxifen and raloxifene can be used to help lower breast cancer risk in certain women. These drugs block the action of estrogen in breast tissue. Raloxifene is only used in women who have gone through menopause, while tamoxifen can be used in women even if they haven't gone through menopause. Experts recommend that these drugs only be used to lower breast cancer risk in women who are known to be at increased risk of the disease. These drugs can also have some side effects, so it's important to understand the possible benefits and risks of taking one of the drugs.

Other drugs are being studied to see if they can lower the risk of breast cancer.

For more information on the possible benefits and risks of chemopreventive drugs, see [Medicines to Reduce Breast Cancer Risk](#).

Preventive surgery for women with very high breast cancer risk

For the few women who have a very high risk for breast cancer, surgery to remove the breasts or ovaries may be an option.

Preventive (prophylactic) mastectomies: Removing both breasts before cancer is diagnosed can greatly reduce the risk of breast cancer (by up to 97%). Some women diagnosed with cancer in one breast choose to have the other, healthy breast removed as well to help prevent a second breast cancer. Breast removal does not completely prevent breast cancer because even a very careful surgeon will leave behind at least some breast cells, which might go on to become cancer.

Some of the reasons for considering this type of surgery may include:

- Mutated *BRCA* genes found by genetic testing
- Strong family history (such as breast cancer in several close relatives)
- Lobular carcinoma in situ (LCIS) seen on biopsy

- Previous cancer in one breast (especially in someone with a strong family history)

This type of surgery has been shown to be helpful in studies of large groups of women with certain conditions, but there's no way to know ahead of time if this surgery will benefit any one woman. Some women with *BRCA* mutations will develop breast cancer early in life, and have a very high risk of getting a second breast cancer. A prophylactic mastectomy before the cancer occurs might add many years to their lives. But while most women with *BRCA* mutations develop breast cancer, some don't. These women would not benefit from the surgery, but they would still have to deal with its aftereffects. Second opinions are strongly recommended before any woman decides to have this surgery.

Prophylactic oophorectomy (removal of the ovaries): Women with a *BRCA* mutation may reduce their risk of breast cancer by 50% or more by having their ovaries surgically removed before menopause. This is likely because the ovaries are the main sources of estrogen in the body.

It's important that women with a *BRCA* mutation recognize they also have a high risk of developing [ovarian cancer](#). Most doctors recommend that women with *BRCA* mutations have their ovaries surgically removed once they finish having children to lower this risk.

Signs and symptoms of breast cancer

Widespread use of screening mammograms has increased the number of breast cancers found before they cause any symptoms. Still some breast cancers are not found by mammograms, either because the test was not done or because even under ideal conditions mammograms do not find every breast cancer.

Breast lump or mass

The most common symptom of breast cancer is a new lump or mass. A mass that's painless, hard, and has irregular edges is more likely to be cancer, but breast cancers can be tender, soft, or rounded. They can even be painful. For this reason, it's important to have any new breast mass, lump, or change checked by a health care provider experienced in diagnosing breast diseases.

Other symptoms

Other possible symptoms of breast cancer include:

- Swelling of all or part of a breast (even if no distinct lump is felt)
- Skin irritation or dimpling
- Breast or nipple pain

- Nipple retraction (turning inward)
- Redness, scaliness, or thickening of the nipple or breast skin
- A nipple discharge other than breast milk

Sometimes breast cancer can spread to lymph nodes under the arm or around the collar bone and cause a lump or swelling there, even before the original tumor in the breast tissue is large enough to be felt.

Although any of these symptoms can be caused by things other than breast cancer, if you have them, see your health care provider so that he or she can find the cause.

American Cancer Society recommendations for early breast cancer detection in women without breast symptoms

The importance of finding breast cancer early

The goal of screening tests for breast cancer is to find it before it causes symptoms (like a lump that can be felt). *Screening* refers to tests and exams used to find a disease in people who don't have any symptoms. *Early detection* means finding and diagnosing a disease earlier than might have happened if you'd waited for symptoms to start.

Breast cancers found during screening exams are more likely to be smaller and still confined to the breast. The size of a breast cancer and how far it has spread are some of the most important factors in predicting the *prognosis* (outlook) of a woman with this disease.

Most doctors feel that early detection tests for breast cancer help save thousands of lives each year, and that many more lives could be saved if even more women and their health care providers took advantage of these tests. Following the American Cancer Society's guidelines for the early detection of breast cancer improves the chances that breast cancer can be found early and treated successfully.

For women at average risk

These guidelines are for women at average risk for breast cancer. Women with a personal history of breast cancer, a family history of breast cancer, a genetic mutation known to increase risk of breast cancer (such as BRCA), and women who had radiation therapy to the chest before the age of 30 are at higher risk for breast cancer, not average-risk. (See below for guidelines for women at higher than average risk.)

Women ages 40 to 44 should have the choice to start annual breast cancer screening with mammograms if they wish to do so. The risks of screening as well as the potential benefits should be considered.

Women age 45 to 54 should get mammograms every year.

Women age 55 and older should switch to mammograms every 2 years, or have the choice to continue yearly screening.

Screening should continue as long as a woman is in good health and is expected to live 10 more years or longer.

All women should be familiar with the known benefits, limitations, and potential harms associated with breast cancer screening. They should also be familiar with how their breasts normally look and feel and report any changes to a health care provider right away.

Mammograms

Regular mammograms can often help find breast cancer at an early stage, when treatment is most likely to be successful. A mammogram can find breast changes that could be cancer years before physical symptoms develop. Results from many decades of research clearly show that women who have regular mammograms are more likely to have breast cancer found early, less likely to need aggressive treatment (like surgery to remove the entire breast [mastectomy] and chemotherapy), and more likely to be cured.

Mammograms are not perfect. They miss some cancers. And sometimes more tests will be needed to find out if something found on a mammogram is or is not cancer. There's also a small possibility of being diagnosed with a cancer that never would have caused any problems had it not been found during screening. It's important that women getting mammograms know what to expect and understand the benefits and limitations of screening.

Clinical breast exam and breast self-exam

Research does not show a clear benefit of physical breast exams done by either a health professional or by yourself for breast cancer screening. Due to this lack of evidence, regular clinical breast exam and breast self-exam are not recommended. Still, all women should be familiar with how their breasts normally look and feel and report any changes to a health care provider right away.

For women at higher than average risk

Women who are at high risk for breast cancer based on certain factors should get an MRI and a mammogram every year. This includes women who:

- Have a lifetime risk of breast cancer of about 20% to 25% or greater, according to risk assessment tools that are based mainly on family history (such as the Claus model – see below)
- Have a known *BRCA1* or *BRCA2* gene mutation
- Have a first-degree relative (parent, brother, sister, or child) with a *BRCA1* or *BRCA2* gene mutation, and have not had genetic testing themselves
- Had radiation therapy to the chest when they were between the ages of 10 and 30 years
- Have Li-Fraumeni syndrome, Cowden syndrome, or Bannayan-Riley-Ruvalcaba syndrome, or have first-degree relatives with one of these syndromes

The American Cancer Society recommends against MRI screening for women whose lifetime risk of breast cancer is less than 15%.

There's not enough evidence to make a recommendation for or against yearly MRI screening for women who have a moderately increased risk of breast cancer (a lifetime risk of 15% to 20% according to risk assessment tools that are based mainly on family history) or who may be at increased risk of breast cancer based on certain factors, such as:

- Having a personal history of breast cancer, ductal carcinoma in situ (DCIS), lobular carcinoma in situ (LCIS), atypical ductal hyperplasia (ADH), or atypical lobular hyperplasia (ALH)
- Having dense breasts (“extremely” or “heterogeneously” dense) as seen on a mammogram

If MRI is used, it should be in addition to, not instead of, a screening mammogram. This is because although an MRI is a more sensitive test (it's more likely to detect cancer than a mammogram), it may still miss some cancers that a mammogram would detect.

For most women at high risk, screening with MRI and mammograms should begin at age 30 years and continue for as long as a woman is in good health. But because the evidence is limited about the best age at which to start screening, this decision should be based on shared decision-making between patients and their health care providers, taking into account personal circumstances and preferences.

Tools used to assess breast cancer risk

Several risk assessment tools, with names such as the Gail model, the Claus model, and the Tyrer-Cuzick model, are available to help health professionals estimate a woman's breast cancer risk. These tools give approximate, rather than precise, estimates of breast cancer risk based on different combinations of risk factors and different data sets.

Because the different tools use different factors to estimate risk, they may give different risk estimates for the same woman. For example, the Gail model bases its risk estimates on certain personal risk factors, like current age, age at first menstrual period and history of prior breast biopsies, along with any history of breast cancer in first-degree relatives. In contrast, the Claus model estimates risk based only on family history of breast cancer in both first and second-degree relatives. These 2 models could easily give different estimates for the same person.

Risk assessment tools (like the Gail model, for example) that are not based mainly on family history are not appropriate to use with the ACS guidelines to decide if a woman should have MRI screening. The use of any of the risk assessment tools and its results should be discussed by a woman with her health care provider.

More on MRI as a screening test

It's recommended that women who get a screening MRI do so at a facility that can do an MRI-guided breast biopsy at the same time if needed. Otherwise, the woman will have to have a second MRI done at another facility when she has the biopsy.

There's no evidence right now that MRI is an effective screening tool for women at average risk. While MRI is more sensitive than mammograms, it also has a higher false-positive rate. (This means it's more likely to find something that turns out not to be cancer.) This would lead to unneeded biopsies and other tests in many of the women screened, which can lead to a lot of worry and anxiety.

The American Cancer Society believes the use of mammograms and MRI (in women at high risk), according to the recommendations outlined above, offers women the best chance to reduce their risk of dying from breast cancer. This approach is clearly better than any one exam or test alone.

See *Mammograms and Other Breast Imaging Tests* for more details on mammograms, breast MRI, breast ultrasound, and other tests that might be used to diagnose breast cancer or find it early.

Paying for breast cancer screening

In the United States, certain laws require most private health plans, Medicaid, and Medicare to cover early detection services for breast cancer screening.

Laws requiring coverage for breast cancer screening

Federal law

Coverage of mammograms for breast cancer screening is mandated by the Affordable Care Act, which provides that these be given without a co-pay or deductible in plans that started after August 1, 2012. This doesn't apply to health plans that were in place before the law was passed (called *grandfathered* plans). You can find out the date your insurance plan started by contacting your health insurance plan administrator. Even grandfathered plans may still have coverage requirements based on state laws, which vary, and other federal laws.

State laws

Many states require that private insurance companies, Medicaid, and public employee health plans provide coverage and reimbursement for specific health services and procedures. The American Cancer Society (ACS) supports these kinds of patient protections, particularly when it comes to evidence-based cancer prevention, early detection, and treatment services.

The only state without a law ensuring that private health plans cover or offer coverage for screening mammograms is Utah. Laws on coverage vary slightly from state to state, so check with your insurer to see what's covered.

Note: State laws don't affect self-insured (self-funded) health plans.

Insurance coverage for breast cancer screening

Self-insured (self-funded) plans

Many employers offer self-insured (self-funded) plans. These plans pay employee health care costs from the employer's own funds, even though they usually contract with another company to track and pay claims.

Self-insured or self-funded plans do not have to follow state laws about breast cancer screening. Instead, they are governed by the Affordable Care Act (ACA), and are required to cover breast cancer screening. The exception is any self-insured plan that was in effect before the ACA was passed. These plans are called *grandfathered*, and they don't have to provide coverage based on what the ACA says.

You can find out if your health plan is self-insured by contacting your insurance administrator at work or reading your Summary of Plan Benefits. Women covered by self-insured employer plans should check to find out what breast cancer early detection services are covered.

Medicare

As a part of the Affordable Care Act, Medicare covers the full cost of a screening mammogram once every 12 months for all women with Medicare aged 40 and over. Diagnostic mammograms are covered with a 20% co-pay after the part B deductible is met.

Medicaid

All state Medicaid programs plus the District of Columbia cover screening mammograms. This coverage may or may not conform to American Cancer Society guidelines. State Medicaid offices should be able to give you details about screening coverage in your state.

National Breast and Cervical Cancer Early Detection Program

States are making breast cancer screening more available to medically underserved women through the Centers for Disease Control and Prevention's (CDC's) National Breast and Cervical Cancer Early Detection Program (NBCCEDP). The NBCCEDP attempts to reach as many women in medically underserved communities as possible, including older women, women without health insurance, and women who are members of racial and ethnic minorities. Age and income requirements vary by state.

The program provides both screening and diagnostic services to low-income, uninsured, and underserved women for free or at very low cost, including:

- Mammograms
- Diagnostic testing for women whose screening results are abnormal
- Surgical consultations
- Referrals to treatment

Each state's Department of Health will have information on how to contact the nearest NBCCEDP screening and early detection program in your area. To learn more, contact the CDC at 1-800-CDC-INFO (1-800-232-4636) or online at www.cdc.gov/cancer/nbccedp.

We have a lot more information you might find helpful. You can read more online or call one of our cancer information specialists at 1-800-227-2345 any time, day or night.

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