







- the *BRCA2* gene. Mutations in this gene can lead to a higher risk of breast cancer.
- **TP53:** The *TP53* gene helps stop the growth of cells with damaged DNA. Inherited mutations of this gene cause **Li-Fraumeni syndrome**. People with this syndrome have an increased risk of breast cancer, as well as some other cancers such as leukemia, brain tumors, and sarcomas (cancers of bones or connective tissue). This mutation is a rare cause of breast cancer.
  - **CHEK2:** The *CHEK2* gene is another gene that normally helps with DNA repair. A *CHEK2* mutation increases breast cancer risk.
  - **PTEN:** The *PTEN* gene normally helps regulate cell growth. Inherited mutations in this gene can cause **Cowdensyndrome**, a rare disorder that puts people at higher risk for both cancer and benign (non-cancer) tumors in the breasts, as well as growths in the digestive tract, thyroid, uterus, and ovaries.
  - **CDH1:** Inherited mutations in this gene cause **hereditary diffuse gastric cancer**, a syndrome in which people develop a rare type of stomach cancer. 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 have pigmented spots on their lips and in their mouths, polyps (abnormal growths) in the urinary and digestive tracts, and a higher risk of many types of cancer, including breast cancer.

Inherited mutations in several other genes have also been linked to breast cancer, but these account for only a small number of cases.

**Genetic counseling and testing:** Genetic testing can be done to look for inherited mutations in the *BRCA1* and *BRCA2* genes (or less commonly in genes such as *PTEN*, *TP53*, or others mentioned above). This might be an option for some women who have been diagnosed with breast cancer, as well as for certain women with factors that put them at higher risk for breast cancer, such as a strong family history. While genetic testing can be helpful in some cases, not every woman needs to be tested, and the pros and cons need to be considered carefully. To learn more, see [Genetic Counseling and Testing for BRCA1 and BRCA2](#).

almost doubles a woman's risk. Having 2 first-degree relatives increases her risk by about 3-fold.

- Women with a father or brother who has had breast cancer also have a higher risk of breast cancer.

## **Having a personal history of breast cancer**

A woman with cancer in one breast has a higher risk of developing a new cancer in the other breast or in another part of the same breast. (This is different from a recurrence or return of the first cancer.) Although this risk is low overall, it's even higher for younger women with breast cancer.

## **Race and ethnicity**

also make it harder to see cancers on mammograms.

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.

To learn more, see our information on [breast density and mammograms](#)<sup>1</sup>.

## Having certain benign breast conditions

Women diagnosed with certain types of benign (non-cancer) breast conditions may have a higher 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 different groups, depending on how they affect this risk.

**Non-proliferative lesions:** These conditions don't seem to affect breast cancer risk, or if they do, the increase in risk is very small. They include:

- Fibrosis and/or simple cysts (sometimes called **fibrocystic changes**)
- 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 tumors (lipoma, hamartoma, hemangioma, neurofibroma, adenomyoepithelioma)

Mastitis (infection of the breast) is not a tumor and does not increase the risk of breast cancer.

**Proliferative lesions without atypia (cell abnormalities):** In these conditions there's excessive growth of cells in the ducts or lobules of the breast, but the cells don't look 0 0 0 rg /GS309

- Fibroadenoma
- Sclerosing adenosis
- Several papillomas (called **papillomatosis**)
- Radial scar

**Proliferative lesions with atypia:** In these conditions, the cells in the ducts or lobules of the breast tissue grow excessively, and some of them no longer look normal. These types of lesions include:

- [Atypical ductal hyperplasia \(ADH\)](#)<sup>2</sup>
- [Atypical lobular hyperplasia \(ALH\)](#)<sup>3</sup>

Breast cancer risk is about 4 to 5 times higher than normal in women with these changes. If a woman also has a family history of breast cancer and either hyperplasia or atypical hyperplasia, she has an even higher risk of breast cancer.

### **Lobular carcinoma in situ (LCIS)**

In [LCIS](#)<sup>4</sup>, cells that look like cancer cells are growing in the lobules of the milk-producing glands of the breast, but they are not growing through the wall of the lobules. LCIS is not considered to be cancer, and it typically does not spread beyond the lobule (that is, it doesn't become invasive breast cancer) if it isn't treated. But women with LCIS have a

## Having radiation to your chest

Women who were treated with [radiation therapy](#)<sup>6</sup> to the chest for another cancer (such as Hodgkin or non-Hodgkin lymphoma) when they were younger have a significantly higher risk for breast cancer. This risk depends on their age when they got radiation. The risk is highest for women who had radiation as a teen or young adult, when the breasts were still developing. Radiation treatment in older women (after about age 40 to 45) does not seem to increase breast cancer risk.

## Exposure to diethylstilbestrol (DES)

From the 1940s through the early 1970s some pregnant women were given an estrogen-like drug called DES 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 while they were pregnant with them may also have a slightly higher risk of breast cancer.

To learn more, see our information about [DES exposure](#)<sup>7</sup>.

## Hyperlinks

1. [www.cancer.org/cancer/types/breast-cancer/screening-tests-and-early-detection/mammograms/breast-density-and-your-mammogram-report.html](http://www.cancer.org/cancer/types/breast-cancer/screening-tests-and-early-detection/mammograms/breast-density-and-your-mammogram-report.html)
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6. [www.cancer.org/cancer/managing-cancer/treatment-types/radiation.html](http://www.cancer.org/cancer/managing-cancer/treatment-types/radiation.html)
7. [www.cancer.org/cancer/risk-prevention/medical-treatments/des-exposure.html](http://www.cancer.org/cancer/risk-prevention/medical-treatments/des-exposure.html)

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## Lifestyle-related Breast Cancer Risk Factors

- [Drinking alcohol](#)
- [Being overweight or obese](#)
- [Not being physically active](#)
- [Not having children](#)
- [Not breastfeeding](#)
- [Birth control](#)
- [Menopausal hormone therapy](#)
- [Breast implants](#)

A risk factor is anything that increases your chances of getting a disease, such as breast cancer. But having a risk factor, or even many, does not mean that you are sure to get the disease.

Certain breast cancer risk factors are related to personal behaviors, such as diet and physical activity. Other lifestyle-related risk factors include decisions about having children and taking medicines that contain hormones.

For information on other known and possible breast cancer risk factors, see:

- [Breast Cancer Risk Factors You Cannot Change](#)
- [Factors with Unclear Effects on Breast Cancer Risk](#)
- [Disproven or Controversial Breast Cancer Risk Factors](#)

## Drinking alcohol

[Drinking alcohol](#)<sup>1</sup> is clearly linked to an increased risk of breast cancer. The risk increases with the amount of alcohol consumed. Women who have 1 alcoholic drink a day have a small (about 7% to 10%) increase in risk compared with those who don't drink, while women who have 2 to 3 drinks a day have about a 20% higher risk. Alcohol is linked to an increased risk of other types of cancer, too.

[It is best not to drink alcohol. Women who do drink should have no more than 1 a day](#)<sup>2</sup>.

## Being overweight or obese

[Being overweight or obese](#)<sup>3</sup> after menopause increases breast cancer risk.

Before menopause, a woman's ovaries make most of her estrogen, and fat tissue makes only a small part of the total amount. After menopause (when the ovaries stop making estrogen), most estrogen comes from fat tissue. Having more fat tissue after menopause can raise estrogen levels and increase the chances of getting breast cancer.

Women who are overweight also tend to have higher blood insulin levels. Higher insulin levels have been linked to some cancers, including breast cancer.

Still, the link between weight and breast cancer risk is complex. For example:

- The risk of breast cancer **after** menopause is higher for women who gained weight as an adult.
- For women who are overweight or obese **before** menopause, the risk is actually lower.

The reasons for this aren't exactly clear.

Weight might also have different effects on different types of breast cancer. For

example:

- Being overweight after menopause is more strongly linked with an increased risk of [hormone receptor-positive breast cancer](#)<sup>4</sup>.
- Some research suggests that being overweight before menopause might increase your risk of the less common [triple-negative breast cancer](#)<sup>5</sup>.

[The American Cancer Society recommends](#)<sup>6</sup> you stay at a healthy weight throughout your life and avoid excess weight gain by balancing your food and drink intake with physical activity.

## Not being physically active

Evidence is growing that regular physical activity reduces breast cancer risk, especially in women past menopause. The main question is how much activity is needed. Some studies have found that even as little as a couple of hours a week might be helpful, although more seems to be better.

Exactly how physical activity might reduce breast cancer risk isn't clear, but it may be due to its effects on body weight, inflammation, and hormone levels.

[The American Cancer Society recommends](#)<sup>7</sup> that adults get 150 to 300 minutes of moderate intensity or 75 to 150 minutes of vigorous intensity activity each week (or a combination of these). Getting to or going over the upper limit of 300 minutes is ideal.

## Not 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 a young age reduces breast cancer risk.

Still, the effect of pregnancy on breast cancer risk is complex. For example, the risk of breast cancer is higher for about the first decade after having a child. The risk then becomes lower over time.

## Not breastfeeding

Most studies suggest that breastfeeding may slightly lower breast cancer risk, especially if it continues for a year or more. But this has been hard to study, especially in countries

like the United States, where breastfeeding for this long is uncommon.

A possible explanation for this effect is 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](#)).

## Birth control

Some birth control methods use hormones, which might increase breast cancer risk.

**Oral contraceptives:** Most studies have found that women using oral contraceptives (birth control pills) have a slightly higher risk of breast cancer than women who have

alone can be used. This is known as **estrogen replacement therapy**

To learn more, see [Menopausal Hormone Therapy and Cancer Risk](#)<sup>10</sup>.

## Breast implants

Breast implants have not been linked with an increased risk of the most common types of breast cancer.

However, in rare cases they have been linked with some other types of cancer, including [breast implant-associated anaplastic large cell lymphoma \(BIA-ALCL\)](#)<sup>11</sup> and other lymphomas, as well as squamous cell carcinoma. These cancers can form in the scar tissue (capsule) around the implant, and they might show up as a lump, a collection of fluid, swelling, or pain, or skin changes near the implant, or as a change in breast size or shape.

## Hyperlinks

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10. [www.cancer.org/cancer/risk-prevention/medical-treatments/menopausal-hormone-replacement-therapy-and-cancer-risk.html](http://www.cancer.org/cancer/risk-prevention/medical-treatments/menopausal-hormone-replacement-therapy-and-cancer-risk.html)

11. [www.cancer.org/cancer/types/breast-cancer/reconstruction-surgery/breast-reconstruction-options/breast-reconstruction-using-implants.html](http://www.cancer.org/cancer/types/breast-cancer/reconstruction-surgery/breast-reconstruction-options/breast-reconstruction-using-implants.html)

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# Factors with Unclear Effects on Breast Cancer Risk

- [Diet and vitamins](#)
- [Chemicals in the environment](#)
- [Tobacco smoke](#)
- [Night shift work](#)

There are some things that might be risk factors for breast cancer, but the research is not yet clear about whether they really affect breast cancer risk.

For information on other known and possible breast cancer risk factors, see:

- [Lifestyle-related Breast Cancer Risk Factors](#)
- [Breast Cancer Risk Factors You Cannot Change](#)
- [Disproven or Controversial Breast Cancer Risk Factors](#)

## Diet and vitamins

While being [overweight or obese and not being physically active](#) have been linked to breast cancer risk, the possible link between diet and breast cancer risk is less clear. Results of some studies have suggested that diet may play a role, while others have not found that diet influences breast cancer risk.

Studies of women in the United States have not found a consistent link between **high-fat diets** and getting breast cancer, although some studies have found a possible link between high-fat diets and a higher risk of *dying* from breast cancer. Studies have also 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. Researchers are still not sure how to explain this. 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 affect breast cancer risk.

We do know that high-fat diets can lead to being overweight or obese, which is a known breast cancer risk factor. A diet high in fat is also a risk factor for some other types of cancer. And eating certain types of fat is clearly linked to a higher risk of heart disease.

Some studies have also suggested that **diets high in fruits and vegetables and calcium-rich dairy products, but low in red and processed meats** might lower the risk of breast cancer. This remains an active area of research.

Several studies looking at women in Asian countries have found that **diets high in soy products** might lower breast cancer risk. But this link has not been as clear in studies looking at women in Western countries. This might be because Asian women generally eat more soy products (and start at an earlier age) than Western women.

Studies looking at **vitamin levels** in the body have had inconsistent results. So far, there's no strong evidence that taking vitamins (or any other type of dietary supplement) reduces the risk of breast cancer.

The lack of a strong link between diet and breast cancer in studies so far doesn't mean that there's no point in eating a healthy diet. A diet low in fat, red meat, and processed meat and high in fruits and vegetables can have many health benefits, including lowering the risk of some other types of cancer.

## 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. In theory, these could affect breast cancer risk.

At this time research does not show a clear link between breast cancer risk and exposure to these substances, but it is hard to study such effects in humans. More studies are needed in this area.

## Tobacco smoke

Some studies have found that heavy smoking over a long time might be linked to a slightly higher risk of breast cancer. In some studies, the risk has been 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.

Researchers are also looking at whether [secondhand smoke](#)<sup>1</sup> increases the risk of

breast cancer. Both mainstream and secondhand smoke contain chemicals that, in high concentrations, cause breast cancer in rodents. Studies in rodents have shown that chemicals in tobacco smoke reach breast tissue and are found in breast milk. In human

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## Disproven or Controversial Breast Cancer Risk Factors

- [Lifestyle-related Breast Cancer Risk Factors](#)
- [Breast Cancer Risk Factors You Cannot Change](#)
- [Factors with Unclear Effects on Breast Cancer Risk](#)

## Antiperspirants

Online and social media 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, eventually leading to breast cancer.

Based on the available evidence (including what we know about how the body works), there is little if any reason to believe that antiperspirants increase the risk of breast cancer. For more information, see [Antiperspirants and Breast Cancer Risk](#)<sup>1</sup>.

## Bras

Online and social media 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, and a 2014 study of more than 1,500 women found no association 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 [Abortion and Breast Cancer Risk](#)<sup>2</sup>.

## Hyperlinks

1. [www.cancer.org/cancer/risk-prevention/chemicals/antiperspirants-and-breast-cancer-risk.html](http://www.cancer.org/cancer/risk-prevention/chemicals/antiperspirants-and-breast-cancer-risk.html)
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## Can I Lower My Risk of Breast Cancer?

- [For all women](#)
- [For women at increased risk of breast cancer](#)

There is no sure way to prevent breast cancer. But there are things you can do that might lower your risk. Many risk factors are beyond your control, such as being born female and getting older. But other risk factors can be changed and may lower your risk.

For women who are known to be at increased risk for breast cancer, there are additional steps that might reduce the risk of developing breast cancer.

### For all women

**Get to and stay at a healthy weight:** Both increased body weight and weight gain as an adult are linked with a higher risk of breast cancer after menopause. The American Cancer Society recommends you stay at a healthy weight throughout your life and avoid excess weight gain by balancing your food intake with physical activity.

**Be physically active:** Many studies have shown that moderate to vigorous physical activity is linked with lower breast cancer risk, so it's important to get regular physical activity. The American Cancer Society recommends that adults get at least 150 to 300 minutes of moderate intensity or 75 to 150 minutes of vigorous intensity activity each week (or a combination of these), preferably spread throughout the week. Getting to or

exceeding the upper limit of 300 minutes is ideal.

**Moderate activity** is anything that makes you breathe as hard as you do during a brisk walk. It causes a slight increase in heart rate and breathing. You should be able to talk, but not sing during the activity.

**Vigorous activities** are performed at a higher intensity. They cause an increased heart rate, sweating, and a faster breathing rate.

**Avoid or limit alcohol:** [Alcohol](#)<sup>1</sup> increases risk of breast cancer. Even drinking small amounts of alcohol has been linked with an increase in risk. It is best not to drink alcohol at all. For women who do drink, they should have no more than 1 alcoholic drink a day. A drink is 12 ounces of beer, 5 ounces of wine, or 1.5 ounces of 80-proof distilled spirits (hard liquor).

#### **Is there a link between diet/vitamins and breast cancer risk?**

The possible link between diet and breast cancer risk is not clear, but this is an active area of study. Some (but not all) studies have suggested that a diet that is high in vegetables, fruit, and calcium-rich dairy products, but low in red and processed meats might help lower the risk of breast cancer. It's also not clear if specific vegetables,



Using [hormone therapy after menopause](#)<sup>3</sup> can increase your risk of breast cancer. To avoid this, talk to your health care provider about non-hormonal options to treat

drugs, called **aromatase inhibitors**

## Hyperlinks

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at [https://www.nccn.org/professionals/physician\\_gls/pdf/genetics\\_bop.pdf](https://www.nccn.org/professionals/physician_gls/pdf/genetics_bop.pdf) on September 1, 2021.

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## Genetic Counseling and Testing for Breast Cancer Risk

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Some people inherit changes (mutations) in certain genes that increase their risk of breast cancer (and possibly other cancers). Genetic testing can look for mutations in some of these genes. While it can be helpful in some cases, not everyone needs to be tested, and each person should carefully consider the pros and cons of testing. It's very important to understand what genetic testing can and can't tell you before these tests are done.

### Inherited gene changes that can increase breast cancer risk

#### ***BRCA1* and *BRCA2* gene mutations**

When it comes to breast cancer risk, the most important inherited gene changes are in the ***BRCA1* and *BRCA2* genes**. Women (and men) with one of these gene changes are said to have [Hereditary Breast and Ovarian Cancer \(HBOC\) syndrome](#)<sup>1</sup>.

- Women with a *BRCA* gene change have a greatly increased risk of breast cancer, as well as an increased risk of ovarian cancer, pancreatic cancer, and possibly some other cancers.
- Men with a *BRCA* gene change are at increased risk of breast cancer (although this risk is lower than in women to begin with), prostate cancer, pancreatic cancer, and possibly some other cancers.

If you have a family history of breast cancer, you have a higher risk of getting breast cancer yourself. **Most women with a family history of breast cancer do not have an inherited gene change that greatly affects their risk.** Still, an inherited gene change is more likely in women with a strong family history of breast cancer, especially if the family history also includes certain other cancers, such as ovarian, pancreatic, or prostate cancer. The risk of having an inherited syndrome is also affected by:

- Which family members are affected (Cancer in close relatives such as a mother or sister is more concerning than cancer in more distant relatives.)
- The number of family members affected
- The age when your relatives were diagnosed (Cancer occurring at a younger age is more of a concern.)

### Other inherited gene mutations

Inherited changes in some other genes can also increase breast cancer risk, including [these genes](#):

- ***PALB2***
- ***CHEK2***
- ***ATM***
- ***CDH1*** (linked with hereditary diffuse gastric cancer)
- ***PTEN*** (linked with Cowden syndrome)
- ***TP53*** (linked with Li-Fraumeni syndrome)

### Considering genetic counseling and testing for breast cancer risk

If you're concerned about your risk because of a personal or family history of breast cancer, talk with your doctor. As a first step, your doctor might use one of several **risk assessment tools** that are now available. These mathematical models use your family

history and other factors to help give you and your doctor a better idea about your risk of having an inherited *BRCA* gene mutation. But these assessment tools aren't perfect, and each one might give different results, so doctors are still trying to figure out how best to use them.

Regardless of whether one of these tools is used, your doctor might suggest you could benefit from speaking with a genetic counselor or other health professional who is trained in genetic counseling. They can review your family history in detail to see how likely it is that you have a [family cancer syndrome](#)<sup>2</sup> such as HBOC. The counselor can also describe genetic testing to you and explain what the tests might be able to tell you, which can help you decide if genetic testing is right for you.

Genetic testing is covered by many health insurance plans, but it might not be covered (or might be covered only partially) by some of them.

If you do decide to get tested, the genetic counselor (or other health professional) can also help explain what the results mean, both for you and possibly other family members. To learn more about genetic testing in general, see [Genetics and Cancer](#)<sup>3</sup>.

## Testing for *BRCA* and other gene mutations

### *BRCA*

- People with a known family history of a *BRCA* (or other) gene mutation
- Women diagnosed with ovarian cancer or pancreatic cancer, or men diagnosed with breast cancer, pancreatic cancer, or high-grade or metastatic prostate cancer
- People with a family history of breast cancer at a younger age, more than one family member with breast cancer, or breast cancer in a male family member
- People with a close family member with a history of ovarian cancer, pancreatic cancer, or metastatic prostate cancer

## How genetic testing is done

Genetic testing can be done on samples of blood or saliva, or from a swab of the inside of a cheek. The samples are sent to a lab for testing.

There are many different possible mutations in the *BRCA* genes. Testing can look for one (or a few) specific mutation(s), or more extensive testing can be done to look for many different *BRCA* mutations. For example, if someone is being tested because they have a family member with a known *BRCA* mutation, testing might focus only on that specific mutation. In people of Ashkenazi Jewish descent, testing might focus on the specific *BRCA* mutations that are most common in this group of people. But if there's no reason to suspect a specific gene change, testing will likely look for many different *BRCA* mutations. Depending on the situation, testing might be done to look for changes in other genes as well.

## Getting the results of genetic testing

Before getting genetic testing, it's important to know ahead of time what the results might or might not tell you about your risk. Genetic testing is not perfect. The tests might not provide clear answers for some people. This is why meeting with a genetic counselor or cancer genetics professional is important, even before being tested.

The results of genetic testing might come back as:

**Positive for a mutation that was tested for.** If the test does find an important mutation, there might be [steps you can take to help lower your risk of breast cancer](#)

genetic test results can't always guarantee that you're not at increased risk. For instance, there might be a chance that you have a gene change that is not currently being tested for.

- **Inconclusive.** In some cases, the test might not be able to tell for sure if you have a gene mutation.
- **Positive for a variant of unknown significance (VUS).** This means that the test found a gene change (variant), but it's not known if this particular change affects your risk.

To learn more about these different types of test results, see [What Happens During Genetic Testing for Cancer Risk?](#)<sup>4</sup>

The results of genetic testing can sometimes be complex or confusing, which is why it's important to go over them with a genetic counselor or cancer genetics professional. They can explain what they might mean for you (and possibly other family members).

## Direct-to-consumer genetic tests

Some genetic tests are now available directly to the public, but there are some concerns with these types of tests. For example, a test that looks for a small number of *BRCA1* and *BRCA2* gene mutations has been approved by the FDA. However, there are more than 1,000 known *BRCA* mutations. This means there are many *BRCA* mutations that would not be detected by this test. People with a negative test result might assume they don't have to be concerned about their risk, when in fact they might still have a different *BRCA* mutation.

Our section on [genetics and cancer](#)<sup>5</sup> has more information about genetic mutations and



5. [www.cancer.org/cancer/risk-prevention/genetics.html](http://www.cancer.org/cancer/risk-prevention/genetics.html)

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# Deciding Whether to Use Medicine to Reduce Breast Cancer Risk





Most experts agree that **tamoxifen and raloxifene** should not be used to reduce breast cancer risk in women who:

- Have a higher risk of serious blood clots\*



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# **Tamoxifen and Raloxifene for Lowering Breast Cancer Risk**

When used to lower the risk of breast cancer, these drugs are typically taken for 5 years. Both drugs are pills taken once a day. Tamoxifen also comes in a liquid form.

Tamoxifen can be an option whether or not you have gone through menopause, but raloxifene is only approved for post-menopausal women.

To learn more about who should (and should not) consider taking one of these drugs, see [Deciding Whether to Use Medicine to Reduce Breast Cancer Risk](#).

## **How much do these drugs lower the risk of breast cancer?**

The effect of these drugs on breast cancer risk has varied in different studies. When the results of all the studies are taken together, the overall reduction in risk for these drugs is about 40% (more than a third).

### **What would this mean for me?**

Although a medicine that cuts your risk by about 40% sounds like it must be a good thing, what it means for you depends on how high your risk is in the first place (your baseline risk).

For example, if you had a 5% risk of getting breast cancer in the next 5 years, you would be considered at increased risk. A 5% risk would mean that over the next 5 years, 5 of 100 women with your risk would be expected to get breast cancer. A 40% reduction in your risk would mean your risk goes down to 3%. This would be a 2% change overall.

Since the change in your overall risk depends on your baseline risk, you would benefit less if you had a lower baseline risk, and you would benefit more if your risk was higher. If you had a baseline risk of only 1.7% in the next 5 years (which is what many expert groups use as a cutoff point for being at 'increased risk'), a 40% change would mean that your risk would go down by less than 1% overall (to about 1%) in the next 5 years.

Your doctor can estimate your breast cancer risk based on factors like your age, medical history, and family history. This can help you see how much benefit you might get from taking one of these drugs.

## **Are there other benefits to taking these drugs?**

Both tamoxifen and raloxifene can **help prevent osteoporosis**, a severe weakening of the bones that can increase the risk of fracture (break). It is a major concern after menopause.

## What are the main risks and side effects of taking these drugs?

### Menopausal symptoms

The most common side effects of these drugs are symptoms of menopause. These include hot flashes and night sweats. Tamoxifen can also cause vaginal dryness and vaginal discharge. Pre-menopausal women taking tamoxifen can have menstrual changes. Menstrual periods can become irregular or even stop. Although periods often start again after the drug is stopped, they don't always, and some women go into menopause. This is more likely in women who were close to menopause when they started taking the drug.

Other, more serious side effects are rare. These include serious blood clots and cancer of the uterus.

### Blood clots

Both tamoxifen and raloxifene increase your risk of developing blood clots in a vein in your leg (deep venous thrombosis) or in your lungs (pulmonary embolism). These clots can sometimes cause serious problems, and even death. In the major studies looking at these drugs for breast cancer prevention, the overall risk of these blood clots over 5 years of treatment was less than 1%. This risk could be higher if you had a serious blood clot in the past, so these drugs are generally not recommended to lower breast



The overall increase in the risk of uterine cancer with tamoxifen use is low (less than 1%), and it goes back to normal within a few years of stopping the drug.

If you have had a hysterectomy (surgery to remove the uterus), you are not at risk for endometrial cancer or uterine sarcoma and do not have to worry about these cancers.

If you are taking tamoxifen, tell your doctor if you have any abnormal vaginal bleeding or spotting, especially after menopause, as these are possible symptoms of uterine cancer.

**Raloxifene** does not act like estrogen in the uterus and is not linked to an increased risk of uterine cancer.

## Hyperlinks

1. [www.cancer.org/cancer/types/breast-cancer/understanding-a-breast-cancer-diagnosis/breast-cancer-hormone-receptor-status.html](http://www.cancer.org/cancer/types/breast-cancer/understanding-a-breast-cancer-diagnosis/breast-cancer-hormone-receptor-status.html)
2. [www.cancer.org/cancer/types/endometrial-cancer.html](http://www.cancer.org/cancer/types/endometrial-cancer.html)
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## Aromatase Inhibitors for Lowering Breast Cancer Risk

- [What are aromatase inhibitors?](#)
- [Can aromatase inhibitors lower the risk of breast cancer?](#)
- [What are the risks and side effects of aromatase inhibitors?](#)

For post-menopausal women with a higher-than-average risk of breast cancer who are considering taking medicine to lower their risk, drugs called aromatase inhibitors (AIs) may be an option instead of tamoxifen or raloxifene.

### What are aromatase inhibitors?

Aromatase inhibitors (AIs) lower estrogen levels by stopping an enzyme in fat tissue (called **aromatase**) from changing other hormones into estrogen. (Estrogen can fuel the growth of breast cancer cells.)

These drugs don't stop the ovaries from making estrogen. They only lower estrogen levels in women whose ovaries aren't making estrogen (such as women who have already gone through menopause). Because of this, they are used mainly in women who have gone through menopause already.

The AIs that have been shown in studies to lower breast cancer risk include:

- **Anastrozole (Arimidex)**
- **Exemestane (Aromasin)**

Like tamoxifen, these drugs are more often used to treat hormone receptor-positive breast cancer than to lower breast cancer risk.

When used to lower breast cancer risk, these drugs are typically taken for 5 years. They are pills taken once a day.

## Can aromatase inhibitors lower the risk of breast cancer?

In large studies, both anastrozole and exemestane have been shown to lower breast cancer risk in postmenopausal women who are at increased risk.

While these drugs are not FDA approved to lower breast cancer risk, some expert groups include them as options (along with [tamoxifen and raloxifene](#)) to reduce breast cancer risk in post-menopausal women at increased risk. For example, they might be a reasonable option for women who have an increased risk of blood clots and therefore should not take tamoxifen or raloxifene.

## What are the risks and side effects of aromatase inhibitors?

The most common side effects of AIs are **symptoms of menopause**, such as hot flashes, night sweats, and vaginal dryness.

These drugs can also cause **muscle and joint pain**. This side effect can be serious enough to cause some women to stop taking the drugs.

Unlike tamoxifen and raloxifene, AIs tend to speed up bone thinning, which can lead to

**osteoporosis.** People with osteoporosis are more likely to have broken bones. Because of this, doctors often recommend checking bone density before starting one of these drugs.

Als may **raise cholesterol.** Women with pre-existing heart disease who take an AI may be at higher risk of having a heart problem.

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US Preventive Services Task Force, Owens DK, Davidson KW, Krist AH, et al. Medication use to reduce risk of breast cancer: US Preventive Services Task Force

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# Preventive Surgery to Reduce Breast Cancer Risk

- [Should I consider surgery to lower my risk of breast cancer?](#)
- [Prophylactic mastectomy](#)
- [Prophylactic oophorectomy \(removal of the ovaries\)](#)
- [Other options to reduce breast cancer risk](#)

Some women who have a very high risk of breast cancer may choose preventive surgery to remove their breasts (**prophylactic mastectomy**) to lower their risk.

## Should I consider surgery to lower my risk of breast cancer?

You might consider preventive surgery if you:

- Have a mutation in the [BRCA1 or BRCA2 gene](#) (or certain other genes that increase breast cancer risk) that is found by [genetic testing](#)
- Have a strong family history of breast cancer (such as breast cancer in several close relatives, or breast cancer in at least one relative at a young age)
- Had radiation therapy to the chest before age 30
- Have (or have had) cancer in one breast (especially if you also have a strong family history)

Like any type of surgery, a mastectomy can have risks and side effects, some of which could affect your quality of life. Because of this, preventive surgery is not usually a good option for women who are at average risk of breast cancer, or for those who are at only slightly increased risk.

For women who are known (or strongly suspected) to have a *BRCA1* or *BRCA2* gene mutation, a **prophylactic oophorectomy** (removal of the ovaries) might be recommended as well.

## Prophylactic mastectomy

A prophylactic mastectomy is surgery to remove one or both breasts to lower the chances of getting breast cancer. There are [different types of mastectomies](#)<sup>1</sup> that might be options.

A prophylactic mastectomy can lower breast cancer risk by 90% or more, but it doesn't guarantee that you will not get breast cancer. This is because it's not possible to remove all breast cells, even with a mastectomy. The breast cells that are left behind might still go on to become cancer.

A prophylactic mastectomy might be considered in two main situations.

### **For women at very high risk of breast cancer**

For women in this group, removing both breasts (known as a **bilateral prophylactic mastectomy**) before cancer is diagnosed can greatly reduce (but not eliminate) the risk of getting breast cancer.

Unfortunately there's no way to know for sure ahead of time if a woman will benefit from this surgery. Most women with a *BRCA1* or *BRCA2* gene mutation will develop breast cancer at some point. Having a prophylactic mastectomy before the cancer develops might add many years to their lives. But not all women with *BRCA1* or *BRCA2* mutations develop breast cancer. For some women the surgery might not have been helpful. Although they might still get some important benefits from the surgery such as peace of mind, they would also have to deal with its aftereffects, which might include physical and emotional side effects.

### **For women already diagnosed with breast cancer**

Some women who have already been diagnosed with breast cancer choose to have the other breast removed at the same time of surgery to remove the breast with cancer. This operation (known as a **contralateral prophylactic mastectomy**, or CPM) can help lower their risk of developing a second breast cancer.

This is more likely to be a good option for women who also have other factors that increase their risk of getting another breast cancer, such as a *BRCA1* or *BRCA2* mutation or a strong family history of breast cancer.

But for women who don't have a family history or other risk factors for breast cancer, the benefit of CPM is less clear. Having breast cancer does raise your risk of getting cancer in the other breast, but this risk is still usually low, and many women overestimate this risk. And while CPM lowers the risk of getting cancer in the other breast, it does not

increase most women's chances of living longer.

Other issues might also be important when considering a CPM. For example, after a mastectomy, the breasts may no longer look the same, even if a woman has [breast reconstruction](#)<sup>2</sup>. Removing both breasts (possibly followed by reconstruction) can help the breasts look more symmetrical after treatment.

Before having this type of surgery, it's very important to talk with a member of your cancer care team or a genetic counselor so that you understand how much you might benefit from it, versus the likelihood of risks and side effects. You might also want to get a second medical opinion, as well as talk to others who have had this surgery, before deciding if it's right for you.

## **Prophylactic oophorectomy (removal of the ovaries)**

Women with a *BRCA1* or *BRCA2* mutation have a high risk of developing breast cancer and ovarian cancer.

Most doctors recommend that women with a *BRCA1* or *BRCA2* mutation have surgery to remove their ovaries (and usually the attached fallopian tubes as well) once they've finished having children. This operation, known as a **prophylactic oophorectomy**, greatly reduces the risk of ovarian cancer. Some studies have suggested it might lower the risk of breast cancer as well, although not all studies have found this. Some women choose to have this surgery done along with a prophylactic mastectomy.

Removing the ovaries causes a woman to go into menopause. This can lead to symptoms such as hot flashes, trouble sleeping, vaginal dryness, loss of bone density, and anxiety or depression.

Again, it's important to talk to your health care team so that you're well informed about the possible benefits, risks, and side effects of this type of surgery. You might also want to talk to other women who have had this surgery before deciding if it's right for you.

## **Other options to reduce breast cancer risk**

If you're concerned about your breast cancer risk, talk to your health care provider. They can help you estimate your risk based on your age, family history, and other factors. If you are at increased risk, you might consider taking [medicines](#) that can help lower your risk. Your health care provider might also suggest you have more intensive [screening](#)<sup>3</sup> for breast cancer, which might include starting screening at a younger age or having other tests in addition to mammography.

There are also other things that all women can do to help lower their risk of breast cancer, such as being active, staying at a healthy weight, and limiting or not drinking alcohol. For more information, see [Can I Lower My Risk of Breast Cancer?](#)

## Hyperlinks

1. [www.cancer.org/cancer/types/breast-cancer/treatment/surgery-for-breast-cancer/mastectomy.html](http://www.cancer.org/cancer/types/breast-cancer/treatment/surgery-for-breast-cancer/mastectomy.html)
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