About Breast Cancer

Breast Cancer Basics

Get an overview of what breast cancer is, how it forms, and how common it is.

- What Is Breast Cancer?
- How Does Breast Cancer Start?
- How Common Is Breast Cancer?
- What’s New in Breast Cancer Research?

Signs and Symptoms of Breast Cancer

The most common symptom of breast cancer is a new lump or mass, but other symptoms are also possible. It's important to have any breast change checked by a health care provider.

- Breast Cancer Signs and Symptoms

What Is Breast Cancer?

Breast cancer starts when cells in the breast begin to grow out of control. These cells usually form a tumor that can often be seen on an x-ray or felt as a lump. The tumor is malignant (cancer) if the cells can grow into (invade) surrounding tissues or spread (metastasize) to distant areas of the body. Breast cancer occurs almost entirely in women, but men can get breast cancer, too.

Cells in nearly any part of the body can become cancer and can spread to other areas. To learn more about cancer and how all cancers start and spread, see Cancer Basics.

Where breast cancer starts
Breast cancers can start from different parts of the breast. Most breast cancers begin in the ducts that carry milk to the nipple (ductal cancers). Some start in the glands that make breast milk (lobular cancers). There are also other types of breast cancer that are less common.

A small number of cancers start in other tissues in the breast. These cancers are called sarcomas and lymphomas and are not really thought of as breast cancers.

Although many types of breast cancer can cause a lump in the breast, not all do. Many breast cancers are found on screening mammograms which can detect cancers at an earlier stage, often before they can be felt, and before symptoms develop. There are other symptoms of breast cancer you should watch for and report to a health care provider.

It’s also important to understand that most breast lumps are benign and not cancer (malignant). Non-cancerous breast tumors are abnormal growths, but they do not spread outside of the breast and they are not life threatening. But some benign breast lumps can increase a woman’s risk of getting breast cancer. Any breast lump or change needs to be checked by a health care professional to determine if it is benign or malignant (cancer) and if it might affect your future cancer risk.
How breast cancer spreads

Breast cancer can spread when the cancer cells get into the blood or lymph system and are carried to other parts of the body.

The lymph system is a network of lymph (or lymphatic) vessels found throughout the body that connects lymph nodes (small bean-shaped collections of immune system cells). The clear fluid inside the lymph vessels, called lymph, contains tissue by-products and waste material, as well as immune system cells. The lymph vessels carry lymph fluid away from the breast. In the case of breast cancer, cancer cells can enter those lymph vessels and start to grow in lymph nodes. Most of the lymph vessels of the breast drain into:

- Lymph nodes under the arm (axillary nodes)
- Lymph nodes around the collar bone (supraclavicular [above the collar bone] and infraclavicular [below the collar bone] lymph nodes)
- Lymph nodes inside the chest near the breast bone (internal mammary lymph nodes)
If cancer cells have spread to your lymph nodes, there is a higher chance that the cells could have traveled through the lymph system and spread (metastasized) to other parts of your body. The more lymph nodes with breast cancer cells, the more likely it is that the cancer may be found in other organs. Because of this, finding cancer in one or more lymph nodes often affects your treatment plan. Usually, you will need surgery to remove one or more lymph nodes to know whether the cancer has spread.

Still, not all women with cancer cells in their lymph nodes develop metastases, and some women with no cancer cells in their lymph nodes develop metastases later.

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**How Does Breast Cancer Start?**

Changes or mutations in DNA can cause normal breast cells to become cancer. Certain DNA changes are passed on from parents (inherited) and can greatly increase your risk for breast cancer. Other lifestyle-related risk factors, such as what you eat and how much you exercise, can increase your chance of developing breast cancer, but it’s not yet known exactly how some of these risk factors cause normal cells to become cancer. Hormones seem to play a role in many cases of breast cancer, but just how this happens is not fully understood.

**Inherited versus acquired DNA mutations**

Normal breast cells become cancer because of changes (mutations) in DNA. DNA is the chemical in our cells that makes up our genes. Genes have the instructions for how our cells function. Some DNA mutations are inherited or passed to you from your parents. This means the mutations are in your cells when you are born and some mutations can greatly increase the risk of certain cancers. They cause many of the cancers that run in some families and often cause cancer when people are younger.

But most DNA changes linked to breast cancer are acquired. This means the change takes place in breast cells during a person’s life rather than having been inherited or born with them. Acquired DNA changes take place over time and are only in the breast cancer cells.

Mutated DNA can lead to mutated genes. Some genes control when our cells grow,
divide into new cells, and die. Changes in these genes can cause the cells to lose normal control and are linked to cancer.

**Proto-oncogenes**

Proto-oncogenes are genes that help cells grow normally. When a proto-oncogene mutates (changes) or there are too many copies of it, it becomes a "bad" gene that can stay turned on or activated when it’s not supposed to be. When this happens, the cell grows out of control and makes more cells that grow out of control. This can lead to cancer. This bad gene is called an oncogene.

Think of a cell as a car. For the car to work properly, there need to be ways to control how fast it goes. A proto-oncogene normally functions in a way that's much like a gas pedal. It helps control how and when the cell grows and divides. An oncogene is like a gas pedal that's stuck down, which causes the cell to divide out of control.

**Tumor suppression genes**

Tumor suppressor genes are normal genes that slow down cell division (cell growth), repair DNA mistakes, or tell cells when to die (a process known as apoptosis or programmed cell death). When tumor suppressor genes don't work properly, cells can grow out of control, make more cells that grow out of control, and don't die when they should, which can lead to cancer.

A tumor suppressor gene is like the brake pedal on a car. It normally keeps the cell from dividing too quickly, just as a brake keeps a car from going too fast. When something goes wrong with the gene, such as a mutation, the “brakes” don’t work and cell division can get out of control.

**Inherited gene changes**

Certain inherited DNA mutations (changes) can dramatically increase the risk for developing certain cancers and are linked to many of the cancers that run in some families. For instance, the BRCA genes (BRCA1 and BRCA2) are tumor suppressor genes. When one of these genes changes, it no longer suppresses abnormal cell growth, and cancer is more likely to develop. A change in one of these genes can be passed from a parent to a child.

Women have already begun to benefit from advances in understanding the genetic
basis of breast cancer. Genetic testing can identify some women who have inherited mutations in the BRCA1 or BRCA2 tumor suppressor genes (or less commonly in other genes such as PALB2, ATM or CHEK2). These women can then take steps to reduce their risk of breast cancer and make plans to look for changes in their breasts to help find cancer at an earlier, more treatable stage. Since these mutations in BRCA 1 and BRCA 2 genes are also associated with other cancers (besides breast), women with these mutations can also consider early screening and preventive actions for other cancers.

Mutations in tumor suppressor genes like the BRCA genes are considered “high penetrance” because they often lead to cancer. Although many women with high penetrance mutations develop cancer, most cases of cancer (including breast cancer) are not caused by this kind of mutation.

More often, low-penetrance mutations or gene variations are a factor in cancer development. Each of these may have a small effect on cancer occurring in any one person, but the overall effect on the population can be large because the mutations are common, and people often have more than one at the same time. The genes involved can affect things like hormone levels, metabolism, or other things that impact risk factors for breast cancer. These genes may cause much of the risk of breast cancer that runs in families.

**Acquired gene changes**

Most DNA mutations related to breast cancer take place in breast cells during a woman’s life rather than having been inherited. These acquired mutations of oncogenes and/or tumor suppressor genes may result from other factors, like radiation or cancer-causing chemicals. But so far, the causes of most acquired mutations that could lead to breast cancer are still unknown. Most breast cancers have several acquired gene mutations.

Tests to spot acquired gene changes may help doctors more accurately predict the outlook (prognosis) for some women with breast cancer. For example, tests can identify women whose breast cancer cells have too many copies of the HER2 oncogene. These cancers tend to grow and spread faster. There are drugs that target these cancer cell changes and improve outcomes for patients.

- **References**

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How Common Is Breast Cancer?

Breast cancer is the most common cancer in American women, except for skin cancers. Currently, the average risk of a woman in the United States developing breast cancer sometime in her life is about 12%. This means there is a 1 in 8 chance she will develop breast cancer. This also means there is a 7 in 8 chance she will never have the disease.

Current year estimates for breast cancer

The American Cancer Society's estimates for breast cancer in the United States for 2018 are:

- About 266,120 new cases of invasive breast cancer will be diagnosed in women.
- About 63,960 new cases of carcinoma in situ (CIS) will be diagnosed (CIS is non-invasive and is the earliest form of breast cancer).
- About 40,920 women will die from breast cancer.

Trends in breast cancer incidence

In recent years, incidence rates have been the stable in white women and increasing slightly (by 0.3% per year) African American women. Breast cancer is more common in these women, compared to women of other races/ethnicities.

Trends in breast cancer deaths

Breast cancer is the second leading cause of cancer death in women (only lung cancer kills more women each year). The chance that a woman will die from breast cancer is about 1 in 38 (about 2.6%).

Death rates from female breast cancer dropped 39% from 1989 to 2015. Since 2007, breast cancer death rates have been steady in women younger than 50, but have continued to decrease in older women.

These decreases are believed to be the result of finding breast cancer earlier through screening and increased awareness, as well as better treatments.
Breast cancer survivors

At this time there are more than 3.1 million breast cancer survivors in the United States. This includes women still being treated and those who have completed treatment.

Survival rates are discussed in the section on breast cancer survival rates by stage.

Visit the American Cancer Society’s Cancer Statistics Center for more key statistics.

• References

Breast Cancer Signs and Symptoms

Knowing how your breasts normally look and feel is an important part of breast health. Finding breast cancer as early as possible gives you a better chance of successful treatment. But knowing what to look for does not take the place of having regular mammograms and other screening tests. Screening tests can help find breast cancer in its early stages, before any symptoms appear.

The most common symptom of breast cancer is a new lump or mass. A painless, hard mass that 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 is important to have any new breast mass, lump, or breast change checked by a health care professional experienced in diagnosing breast diseases.

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 (sometimes looking like an orange peel)
• Breast or nipple pain
• Nipple retraction (turning inward)
• Redness, scaliness, or thickening of the nipple or breast skin
• Nipple discharge (other than breast milk)

Sometimes a 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 is large enough to be felt. Swollen lymph nodes should also be checked by a
health care provider.

Although any of these symptoms can be caused by things other than breast cancer, if you have them, they should be reported to a health care professional so that the cause can be found.

Because mammograms do not find every breast cancer, it is important for you to be aware of changes in your breasts and to know the signs and symptoms of breast cancer.

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What’s New in Breast Cancer Research?

Researchers around the world are working to find better ways to prevent, detect, and treat breast cancer, and to improve the quality of life of patients and survivors.

Some of the many active areas of research include:

- Breast cancer causes
- Causes and treatment of metastatic breast cancer
- Reducing breast cancer risk
- Managing ductal carcinoma in situ (DCIS)
- New lab tests for breast cancer
- New imaging tests for breast cancer
- Breast cancer treatment
- Supportive care

Breast cancer causes

Studies continue to uncover lifestyle factors and habits, as well as inherited genes, that affect breast cancer risk. Here are a few examples:

- Several studies are looking at the effect of exercise, weight gain or loss, and diet on
risk.
- Studies on the best use of genetic testing for breast cancer mutations continue at a rapid pace.
- Scientists are exploring how common gene variations (small changes in genes that are not as significant as mutations) may affect breast cancer risk. Gene variants typically have only a modest effect on risk, but when taken together they could possibly have a large impact.
- Possible environmental causes of breast cancer have also received more attention in recent years. While much of the science on this topic is still in its earliest stages, this is an area of active research.

Reducing breast cancer risk

Researchers continue to look for medicines that might help lower breast cancer risk, especially women who are at high risk.

- Hormone therapy drugs are typically used to help treat breast cancer, but some might also help prevent it. Tamoxifen and raloxifene have been used for many years to prevent breast cancer. More recent studies with another class of drugs called aromatase inhibitors (exemestane and anastrozole) have shown that these drugs are also very effective in preventing breast cancer.
- Other clinical trials are looking at non-hormonal drugs for breast cancer reduction. Drugs of interest include drugs for osteoporosis and bone metastases, COX-2 inhibitors, non-steroidal anti-inflammatory drugs, and statins (used to lower cholesterol).

When breast cancer spreads, it often goes to the bones. Some drugs that help treat the spread of cancer to the bones (such as bisphosphonates and denosumab), might also help reduce the chances of the cancer coming back. Studies done so far seem to suggest that postmenopausal women may benefit the most from giving these bone-modifying drugs after breast surgery, but more studies are needed to say for sure.

This type of research takes many years. It might be some time before meaningful results on any of these compounds are available.

Managing DCIS

In ductal carcinoma in situ (DCIS), the abnormal cells are in the milk duct and have not grown outside the duct. In some women, DCIS turns into invasive breast cancer, or
sometimes an area of DCIS contains invasive cancer. In other women, though, the cells just stay within the ducts and never invade deeper or spread to lymph nodes or other organs. The uncertainty about how DCIS will behave can make it hard to choose the best treatments. Researchers are looking for ways to help with these challenges.

Researchers are studying ways to use computers and statistical methods to estimate the odds that a woman’s DCIS will become invasive. Decision aids are another approach. They ask a woman with DCIS questions that help her decide which factors (such as survival, preventing recurrence, and side effects) she considers most important in choosing a treatment.

**New lab tests**

**Tests for circulating tumor cells (CTCs)**

Researchers have found that in many women with breast cancer, cells may break away from the tumor and enter the blood. These circulating tumor cells (CTCs) can be detected with sensitive lab tests. Although these tests can help predict which patients may have breast cancer that has spread beyond the breast (metastatic disease), it isn’t clear if the use of these tests can tell whether the cancer will come back after treatment (recur) or help patients live longer. Some studies are looking at if these CTCs can be removed and then tested in the lab to determine which specific anticancer drugs will work on the tumor.

**New imaging tests**

Newer imaging methods are now being studied for evaluating breast changes that may be cancer.

**Scintimammography (molecular breast imaging)**

In this test, a slightly radioactive drug called a tracer is injected into a vein. The tracer attaches to breast cancer cells and is detected by a special camera.

This technique is still being studied to see if it will be useful in finding breast cancers. Some doctors believe it may be helpful in looking at suspicious areas found by regular mammograms, but its exact role is still unclear. Current research is aimed at improving the technology and evaluating its use in specific situations such as in the dense breasts of younger women.
Breast cancer treatment

Chemotherapy

It is known that chemotherapy can be helpful for many breast cancer patients. But predicting who will benefit the most or the least is still being studied. Sometimes there are significant side effects (long- and short-term) from chemotherapy, so having tests that can determine who really needs chemo would be useful. Many studies are being done to evaluate different tests that can more accurately tell which patients would benefit from chemo and which patients could avoid it.

Oncoplastic surgery

Breast-conserving surgery (lumpectomy or partial mastectomy) can often be used for early-stage breast cancers. But for some women, it can result in breasts of different sizes and/or shapes. For larger tumors, it might not even be possible, and a mastectomy might be needed instead. Some doctors are addressing this problem by combining cancer surgery and plastic surgery techniques, known as oncoplastic surgery. This typically involves reshaping the breast at the time of the initial surgery, such as doing a partial breast reconstruction after breast-conserving surgery or a full reconstruction after mastectomy. Oncoplastic surgery may mean operating on the other breast as well to make the breasts more alike.

Triple-negative breast cancer

Since triple-negative breast cancers cannot be treated with hormone therapy or targeted therapy such as Her-2 drugs, the treatment options are limited to chemotherapy. Other potential targets for new breast cancer drugs have been identified in recent years. Drugs based on these targets, such as kinase inhibitors and immunotherapy, are now being studied to treat triple-negative breast cancers, either by themselves, in combination, or with chemotherapy.

Targeted therapy drugs

Targeted therapies are a group of drugs that specifically target gene changes in cancer cells that help the cells grow or spread. New targeted therapies are being studied for use against breast cancer, including PARP inhibitors. These drugs are most likely to be helpful against cancers caused by BRCA mutations, and have shown some promise in treating some types of breast cancers. Two PARP inhibitors that have been studied in
BRCA-positive breast cancer with encouraging results include olaparib and veliparib.

**Supportive care**

There are trials looking at different medicines to try and improve memory and brain symptoms after chemotherapy. Other studies are evaluating if certain cardiac drugs, known as beta-blockers, can prevent the heart damage sometimes caused by the common breast cancer chemotherapy drugs, doxorubicin and epirubicin.

**Thinking about taking part in a clinical trial**

Clinical trials are carefully controlled research studies that are done to get a closer look at promising new treatments or procedures. Clinical trials are one way to get state-of-the-art cancer treatment. In some cases, they may be the only way to get access to newer treatments. They are also the best way for doctors to learn better methods to treat cancer. Still, they are not right for everyone.

If you would like to learn more about clinical trials that might be right for you, start by asking your doctor if your clinic or hospital conducts clinical trials. You can also call our clinical trials matching service at 1-800-303-5691 for a list of studies that meet your medical needs, or see Clinical Trials to learn more.

- **References**

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For additional assistance please contact your American Cancer Society
1-800-227-2345 or www.cancer.org
Breast Cancer Risk and Prevention

Risk Factors for Breast Cancer

A risk factor is anything that affects your chance of getting a disease, such as cancer. But having a risk factor, or even many, does not mean that you are sure to get the disease. While you can't change some breast cancer risk factors—family history and aging, for example—there are some risk factors that you can control.

- **Lifestyle-related Breast Cancer Risk Factors**
- **Breast Cancer Risk Factors You Cannot Change**
- **Factors with Unclear Effects on Breast Cancer Risk**
- **Disproven or Controversial Breast Cancer Risk Factors**

Can Breast Cancer Be Prevented?

There is no sure way to prevent breast cancer. But there are things you can do that might lower your risk. This can be especially helpful for women with certain risk factors for breast cancer, such as having a strong family history or certain gene changes.

- **Can I Lower My Risk of Breast Cancer?**
- **Deciding Whether to Use Medicine to Reduce Breast Cancer Risk**
- **Tamoxifen and Raloxifene for Lowering Breast Cancer Risk**
- **Aromatase Inhibitors for Lowering Breast Cancer Risk**
- **Preventive Surgery to Reduce Breast Cancer Risk**

Breast Cancer Risk Factors You Cannot Change

A risk factor is anything that affects your chance 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.

Some risk factors for breast cancer are things you cannot change, such as being a woman, getting older, and having certain gene changes. These make your risk of breast cancer higher.

**Being a woman**

Simply being a woman is the main risk factor for breast cancer. Men can get breast cancer, too, but this disease is about 100 times more common in women than in men.

**Getting older**

As you get older, your risk of breast cancer goes up. Most breast cancers are found in women age 55 and older.

**Certain inherited genes**

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

**BRCA1 and BRCA2:** The most common cause of hereditary breast cancer is an inherited mutation in the *BRCA1* or *BRCA2* gene. In normal cells, these genes help make proteins that repair damaged DNA. Mutated versions of these genes can lead to abnormal cell growth, which can lead to cancer.

- If you have inherited a mutated copy of either gene from a parent, you have a higher risk of breast cancer.
- On average, a woman with a *BRCA1* or *BRCA2* gene mutation has about a 7 in 10 chance of getting breast cancer by age 80. This risk is also affected by how many other family members have had breast cancer. (It goes up if more family members are affected.)
- Women with one of these mutations are more likely to be diagnosed with breast cancer at a younger age, as well as to have cancer in both breasts. They also have a higher risk of developing some other cancers, mainly 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
anyone can have them.

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

- **ATM:** The *ATM* gene normally helps repair damaged DNA (or helps kill the cell if the damaged can't be fixed). Inheriting 2 abnormal copies of this gene 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 gives instructions for making 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 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 can increase breast cancer risk about 2-fold.
- **PTEN:** The *PTEN* gene normally helps regulate cell growth. Inherited mutations in this gene can cause *Cowden syndrome*, a rare disorder that puts people at higher risk for both non-cancer and 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.
- **PALB2:** The *PALB2* gene makes a protein that interacts with the protein made by the **BRCA2** gene. Mutations in this gene can lead to a higher risk of breast cancer. Mutations in several other genes have also been linked to breast cancer, but these account for only a small number of cases.

**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**). While testing can be helpful in some cases, not every woman needs to be tested, and the pros and cons need to be considered carefully.

If you’re thinking about genetic testing, it’s strongly recommended that you first talk to a
genetic counselor, nurse, or doctor who can explain 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 costs a lot and might not be covered by some health insurance plans.

Our section on genetics and cancer has more information about genetic mutations and testing for them.

**Having a family history of breast cancer**

It’s important to note that most women (about 8 out of 10) who get breast cancer do not have a family history of the disease. But women who have close blood relatives with breast cancer have a higher risk:

- Having a first-degree relative (mother, sister, or daughter) with breast cancer almost doubles a woman’s risk. Having 2 first-degree relatives increases her risk about 3-fold.
- Women with a father or brother who have had breast cancer also have a higher risk of breast cancer.

Overall, less than 15% of women with breast cancer have a family member with this disease.

**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.

**Your race and ethnicity**

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

**Having dense breast tissue**
Breasts are made up of fatty tissue, fibrous tissue, and glandular tissue. Someone is said to have dense breasts (on a mammogram) when they have more glandular and fibrous tissue and less fatty tissue. Women with dense breasts on mammogram have a risk of breast cancer that is about 1.5 to 2 times that of women with average breast density. Unfortunately, dense breast tissue can 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.

For more information, see our information on breast density and mammograms.

**Certain benign breast conditions**

Women diagnosed with certain 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 3 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 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 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
very abnormal. These conditions seem to raise a woman’s risk of breast cancer slightly. They include:

- Usual ductal hyperplasia (without atypia)
- 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)
- Atypical lobular hyperplasia (ALH)

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.

For more information, see [Non-cancerous Breast Conditions](#).

**Lobular carcinoma in situ (LCIS)**

In LCIS, 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 also called lobular neoplasia. It’s 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 much higher risk of developing cancer in either breast.

**Starting menstruation (periods) early**

Women who have had more menstrual cycles because they started menstruating early (especially 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 because they have a longer lifetime exposure to the hormones estrogen and progesterone.

**Having radiation to your chest**

Women who were treated with radiation therapy to the chest for another cancer (such as Hodgkin disease or non-Hodgkin lymphoma) when they were younger have a significantly higher risk for breast cancer. This varies with the patient’s age when they got radiation. The risk is highest if you had radiation as a teen or young adult, when your breasts were still developing. Radiation treatment after age 40 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 during pregnancy may also have a slightly higher risk of breast cancer.

To learn more, see our information about [DES exposure](#).

**References**

Lifestyle-related Breast Cancer Risk Factors

A risk factor is anything that affects your chance 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 exercise. Other lifestyle-related risk factors include decisions about having children and taking medicines that contain hormones.

Drinking alcohol

Drinking alcohol is clearly linked to an increased risk of breast cancer. The risk increases with the amount of alcohol consumed. Compared with non-drinkers, women who have 1 alcoholic drink a day have a very small increase in risk. Those who have 2 to 3 drinks a day have about a 20% higher risk compared to women who don’t drink alcohol. Excessive alcohol consumption is known to increase the risk of other cancers, too.
The American Cancer Society recommends that women who drink have no more than 1 drink a day.

**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 only 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 raise estrogen levels and increase your chance of getting breast cancer. Also, women who are overweight 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 instance, risk appears to be increased for women who gained weight as an adult, but may not be increased among those who have been overweight since childhood. Also, excess fat in the waist area may affect risk more than the same amount of fat in the hips and thighs. Researchers believe that fat cells in various parts of the body have subtle differences that may explain this.

Weight might also have different effects on different types of breast cancer. For example, some research suggests that being overweight before menopause might increase your risk of triple-negative breast cancer.

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.

**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, hormones, and energy balance.

*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.

**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 an early age reduces breast cancer risk. Still, the effect of pregnancy seems to be different for different types of breast cancer. For a certain type of breast cancer known as triple-negative, pregnancy seems to increase risk.

**Not breastfeeding**

Some studies suggest that breastfeeding may slightly lower breast cancer risk, especially if it’s continued for 1½ to 2 years. But this has been hard to study, especially in countries like the United States, where breastfeeding for this long is uncommon.

The explanation 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).

**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 never used them. Once the pills are stopped, this risk seems to go back to normal over time. Women who stopped using oral contraceptives more than 10 years ago do not appear to have any increased breast cancer risk.

**Birth control shot:** Depo-Provera is an injectable form of progesterone that’s given once every 3 months for birth control. Some studies have found that women currently using birth-control shots seem to have an increase in breast cancer risk, but it appears that there is no increased risk in women 5 years after they stop getting the shots.

**Birth control implants, intrauterine devices (IUDs), skin patches, vaginal rings:** These forms of birth control also use hormones, which in theory could fuel breast cancer growth. Some studies have shown a link between use of hormone-releasing IUDs and breast cancer risk, but few studies have looked at the use of birth control
implants, patches, and rings and breast cancer risk.

When thinking about using hormonal birth control, women should discuss their other risk factors for breast cancer with their health care provider.

**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 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 (who no longer have a uterus), estrogen alone can be used. This is known as *estrogen replacement therapy* (ERT) or just *estrogen therapy* (ET).

**Combined hormone therapy (HT):** Use of combined hormone therapy after menopause increases the risk of breast cancer. It may also increase the chances of dying from breast cancer. This increase in risk can be seen with as little as 2 years of use. Combined HT also increases the likelihood that the cancer may be found at a more advanced stage.

The increased risk from combined HT appears to apply only to current and recent users. A woman’s breast cancer risk seems to return to that of the general population within 5 years of stopping treatment.

**Bioidentical hormone therapy:** The word *bioidentical* is sometimes used to describe versions of estrogen and progesterone with the same chemical structure as those found naturally in people. The use of these hormones has been marketed as a safe way to treat the symptoms of menopause. But because there aren’t many studies comparing “bioidentical” or “natural” hormones to synthetic versions of hormones, there’s no proof that they’re safer or more effective. More studies are needed to know for sure. The use of these bioidentical hormones should be considered to have the same health risks as any other type of hormone therapy.

**Estrogen therapy (ET):** The use of estrogen alone after menopause does not seem to increase the risk of breast cancer much, if at all. But when used long term (for more
than 15 years), ET has been found to increase the risk of ovarian and breast cancer in some studies.

At this time there aren't many strong reasons to use post-menopausal hormone therapy (either combined HT or ET), other than possibly for the short-term relief of menopausal symptoms. Along with the increased risk of breast cancer, combined HT also appears to increase the risk of heart disease, blood clots, and strokes. It does lower the risk of colorectal cancer and osteoporosis, but this must be weighed against the possible harms, especially since there are other ways to prevent and treat osteoporosis, and screening can sometimes prevent colon cancer. ET does not seem to increase breast cancer risk, but it does increase the risk of stroke.

The decision to use HT should be made by a woman and her doctor after weighing the possible risks and benefits (including the severity of her menopausal symptoms), and considering her other risk factors for heart disease, breast cancer, and osteoporosis. If they decide she should try HT for symptoms of menopause, it's usually best to use it at the lowest dose that works for her and for as short a time as possible.

- **References**


Factors with Unclear Effects on Breast Cancer Risk

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. They include things like tobacco smoke and working at night.

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 shown that diet may play a role, while others have not found that diet influences breast cancer risk.

Most studies of women in the United States have not found a link between breast cancer risk and fat in the diet. Still, 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. 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 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 intake of certain types of fat is clearly related to higher risk of heart disease.

Studies looking at vitamin levels have had inconsistent results. So far, no study has shown that taking vitamins reduces the risk of breast cancer (or any other cancer). But this does not mean that there’s no point in eating a healthy diet. A diet low in fat, low in red meat and processed meat, and high in fruits and vegetables can clearly have other health benefits, including lowering the risk of some other cancers.

**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.

Compounds 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.

This issue causes 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. Studying such effects in humans is hard to do. More research is needed to better define the possible health effects of these substances and others like them.
Tobacco smoke

For a long time, studies showed no link between cigarette smoking and breast cancer. But in recent years, more studies have shown that heavy smoking over a long time might be linked to a 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 increases the risk of breast cancer. Both mainstream and secondhand smoke contain chemicals that, in high concentrations, cause breast cancer in rodents. Studies have shown that chemicals in tobacco smoke reach breast tissue and are found in breast milk of rodents. In human studies, the evidence on secondhand smoke and breast cancer risk is not clear. Most studies have not found a link, but some studies have suggested it may increase risk, particularly in premenopausal 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 shift work

Some studies have suggested that women who work at night, such as nurses on a night shift, might have an increased risk of breast cancer. This is a fairly recent finding, and more studies are looking at this. Some researchers think the effect may be due to changes in levels of melatonin, a hormone that’s affected by the body’s exposure to light, but other hormones are also being studied.

- References


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, 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.

Bras

Internet and e-mail rumors and at least one book have suggested that bras cause breast cancer by obstructing lymph flow. There is no good 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.

Breast implants

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

Certain types of breast implants can be linked to a rare type of cancer called anaplastic large cell lymphoma (ALCL). It’s sometimes referred to as breast implant-associated anaplastic large cell lymphoma (BIA-ALCL). This lymphoma appears to happen more often in implants with textured (rough) surfaces rather than smooth surfaces. If ALCL does show up after an implant, it can show up as a lump, a collection of fluid near the implant, pain, swelling or asymmetry (uneven breasts). It usually responds well to treatment.

- References


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Can I Lower My 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 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 minutes of moderate intensity or 75 minutes of vigorous intensity activity each week (or a combination of these), preferably spread throughout the week.

<table>
<thead>
<tr>
<th>Moderate activity</th>
<th>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.</th>
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<tbody>
<tr>
<td>Vigorous activities</td>
<td>are performed at a higher intensity. They cause an increased heart rate, sweating, and a faster breathing rate. Activities that improve strength and flexibility, such as weight lifting, stretching, or yoga, are also beneficial.</td>
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**Limit or avoid alcohol:** Alcohol also increases risk of breast cancer. Even low levels of alcohol intake have been linked with an increase in risk. The American Cancer Society recommends that women who drink 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. A diet that is rich in vegetables, fruit, poultry, fish, and low-fat dairy products has been linked with a lower risk of breast cancer in some studies. But it is not clear if specific vegetables, fruits, or other foods can lower risk. And most studies
have not found that lowering fat intake has much of an effect on breast cancer risk. But this does not mean that there’s no point in eating a healthy diet. A diet low in fat, low in processed and red meat, and high in fruits and vegetables can clearly have other health benefits, including lowering the risk of some other cancers. So far, no study has shown that taking vitamins or other supplements reduces the risk of breast cancer (or any other cancer).

For more on the links between body weight, physical activity, diet, and breast cancer (as well as other cancers), see American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention.

Other factors that might lower risk: Women who choose to breastfeed for at least several months may also get an added benefit of reducing their breast cancer risk.

Using hormone therapy after menopause can increase your risk of breast cancer. To avoid this, talk to your health care provider about non-hormonal options to treat menopausal symptoms.

For women at increased risk of breast cancer

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 gene mutation that increases breast cancer risk, such as in the BRCA1 or BRCA2 gene, or you have had DCIS or LCIS), there are some things you can do to help lower your chances of developing breast cancer.

Your health care provider can help you determine your risk of breast cancer, as well as which, if any, of these options might be right for you.

Medicines to lower breast cancer risk

Prescription medicines can be used to help lower breast cancer risk in certain women at increased risk of breast cancer. (This risk is usually determined with a risk assessment tool known as the Gail Model.)

Medicines such as tamoxifen and raloxifene block the action of estrogen in breast
tissue. Tamoxifen can be taken even if you haven’t gone through menopause, while raloxifene is only used for women who have gone through menopause. Other drugs, called *aromatase inhibitors*, might also be an option for women past menopause. All of these medicines can also have side effects, so it’s important to understand the possible benefits and risks of taking one of them.

To learn more, see:

- Deciding Whether to Use Medicine to Reduce Breast Cancer Risk
- Tamoxifen and Raloxifene for Lowering Breast Cancer Risk
- Aromatase Inhibitors for Lowering Breast Cancer Risk

**Preventive surgery for women with very high breast cancer risk**

For the small fraction of women who have a very high risk for breast cancer, surgery to remove the breasts may be an option. Another option might be to remove the ovaries, which are the main source of estrogen in the body. While surgery can lower the risk of breast cancer, it can’t eliminate it completely, and it can come with its own side effects. For more on this topic, see Preventive Surgery to Reduce Breast Cancer Risk.

Before deciding which, if any, of these options might be right for you, talk with your health care provider to understand your risk of breast cancer and how much any of these approaches might lower this risk.

For women at increased breast cancer risk who don’t want to take medicines or have surgery, another option is to have more frequent doctor visits and tests to look for breast cancer. This is sometimes referred to as close observation. While this approach doesn’t lower breast cancer risk, it might help find it early, when it’s likely to be easier to treat.

- **References**


Deciding Whether to Use Medicine to Reduce Breast Cancer Risk

For women with a higher than average risk of breast cancer, some medicines can help reduce this risk. But these drugs can also have side effects, so it's important to weigh their pros and cons before deciding whether to take one.

Should I take a drug to help reduce my breast cancer risk?

Taking medicines to help lower the risk of getting a disease is called chemoprevention. The most commonly used medicines to lower breast cancer risk are tamoxifen and raloxifene. Other medicines called aromatase inhibitors (such as anastrozole and exemestane) might also be options.

The first step in deciding if you should take a drug to help lower your chances of getting breast cancer is to have a health care provider assess your breast cancer risk. (See below for names of tools that can be used to do this.)

For now, most experts say that your breast cancer risk should be higher than average for you to consider taking one of these drugs. If you do have a higher than average risk, you need to compare the benefit of possibly reducing your chance of getting breast cancer with the risk of side effects and other problems from taking one of these drugs.

Your risk factors need to be identified to find out if you are at higher than average risk for breast cancer. A risk factor is anything that affects your risk of getting a disease. But keep in mind that having risk factors that are linked to a higher risk does not mean that you will definitely develop breast cancer. In fact, most women who have one or more risk factors will never develop breast cancer.

Some important risk factors for breast cancer include:

- Being a woman
- Getting older
- Having blood relatives who had breast cancer
- Your menstrual history
- Your pregnancy history
• Having had invasive breast cancer or **ductal carcinoma in situ (DCIS)** in the past
• Being diagnosed with **lobular carcinoma in situ (LCIS)**
• Being diagnosed with **atypical ductal hyperplasia (ADH) or atypical lobular hyperplasia (ALH)**
• Having a gene mutation linked to a **family cancer syndrome** (such as a **BRCA** mutation)

**How is breast cancer risk assessed?**

Researchers have built some statistical models to help predict a woman’s risk of getting breast cancer.

The **Breast Cancer Risk Assessment Tool** (also called the **Gail Model**) is commonly used to assess this risk. It can estimate your risk of getting breast cancer in the next 5 years and over your lifetime, based on many of the factors listed above.

The tool does have some limits, though. For instance, it only looks at family history in close relatives (like siblings, parents, and children). And it doesn’t estimate risk if you have a history of ductal carcinoma in situ (DCIS), lobular carcinoma in situ (LCIS), or have had breast cancer. It’s also not helpful if you have a family cancer syndrome.

Also, the data that this tool is based on didn’t include Hispanic/Latina, American Indian, or Alaskan Native women, so estimates for these women may not be accurate.

Other risk assessment tools, such as the Tyrer-Cuzick model and the Claus model, are based largely on family history.

These tools can give you a rough estimate of your risk, but no tool or test can tell for sure if you’ll develop breast cancer.

**How high does my risk need to be?**

There is no single definition of a higher than average risk of breast cancer. But most major studies have used a 1.7% risk of developing breast cancer over the next 5 years as their cut-off point. (1.7% is average risk of a 60-year-old woman.)

Some medical organizations recommend that doctors discuss the use of medicines to lower breast cancer risk in women at least 35 years old who have a 5-year risk of 1.7% or higher. Others might use different cutoff points.
The American Cancer Society does not have recommendations for the use of medicines to help lower the risk of breast cancer.

**Are there reasons not to take one of these drugs to help reduce breast cancer risk?**

All drugs have risks and side effects that must be discussed when making the decision about chemoprevention.

Most experts agree that neither **tamoxifen nor raloxifene** should be used to reduce breast cancer risk in women who:

- Have a higher risk of serious blood clots*
- Are pregnant or planning to become pregnant
- Are breastfeeding
- Are taking estrogen (including birth control pills or shots, or menopausal hormone therapy)
- Are taking an aromatase inhibitor
- Are younger than 35 years old

*Women who have a higher risk of serious blood clots include those who have ever had serious blood clots (deep venous thrombosis [DVT] or pulmonary embolism [PE]). Many doctors also feel that if you've had a stroke or heart attack you also have a higher risk of blood clots if you take these drugs. If you smoke, are obese, or have (or are being treated for) high blood pressure or diabetes you also have a higher risk of serious blood clots. Women with these conditions should talk to their doctors to see if the benefits of chemoprevention outweigh the risks.

A woman who has been diagnosed with any type of uterine cancer or atypical hyperplasia of the uterus (a kind of pre-cancer) should not take tamoxifen to help lower breast cancer risk.

Raloxifene has not been tested in pre-menopausal women, and should only be used if you have gone through menopause.

**Aromatase inhibitors** are not useful for pre-menopausal women, and should only be used if you have gone through menopause. These drugs can cause bone thinning (osteoporosis), so they’re not likely to be a good option in women who already have thin or weakened bones.

Talk with your doctor about your total health picture to make the best possible choice for
Tamoxifen and Raloxifene for Lowering Breast Cancer Risk

Tamoxifen and raloxifene have been shown to reduce the risk of breast cancer, but they can have their own risks and side effects. Tamoxifen and raloxifene are the only drugs that are approved in the US to help lower the risk of breast cancer, although for some women, drugs called aromatase inhibitors might be an option as well.

References


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What kind of drugs are tamoxifen and raloxifene?

Both of these drugs are selective estrogen receptor modulators (SERMs). This means that they act against (or block) estrogen (a female hormone) in some tissues of the body, but act like estrogen in others. Estrogen can fuel the growth of breast cancer cells. Both of these drugs block estrogen in breast cells, which is why they can be useful in lowering breast cancer risk.

These drugs are used more often for other things.

- Tamoxifen is used mainly to treat hormone receptor-positive breast cancer (breast cancer with cells that have estrogen and/or progesterone receptors on them).
- Raloxifene is used mostly to prevent and treat osteoporosis (very weak bones) in post-menopausal women.

To lower the risk of breast cancer, these drugs are taken for 5 years. Both drugs are pills taken once a day. Tamoxifen also comes in a liquid form. Tamoxifen can be taken whether or not you have gone through menopause, but raloxifene is only approved for post-menopausal women.

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). These drugs lower the risk of both invasive breast cancer and ductal carcinoma in situ (DCIS).

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 would really mean for you depends on how high your risk is in the first place (your baseline risk).

For example, if you had an 8% risk of getting breast cancer in the next 5 years, you would be considered to be at increased risk. An 8% risk would mean that over the next 5 years, 8 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 5%. This would be only a 3% 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 organizations use as a cutoff point for being at 'increased risk'), the 40% change would mean that your risk would go down to about 1% in the next 5 years. This means your overall risk in the next 5 years would go down by less than 1%.

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 is more common 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 experience 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 cancer risk for anyone with a history of blood clots.

Because these drugs increase your risk of developing serious blood clots, there is also concern that they might also increase your risk of heart attack or stroke, although this is not clear. This is something you might want to discuss with your doctor, especially if you have a history of a heart attack or stroke, or if you are at increased risk for them (see *Deciding Whether to Use Medicine to Reduce Breast Cancer Risk*).

**Cancer of the uterus**

Because tamoxifen acts like estrogen in the uterus, it can increase your risk of endometrial cancer and uterine sarcoma (cancers of the uterus). It also is linked to a higher risk of endometrial pre-cancers. Raloxifene does not act like estrogen in the uterus and is not linked to an increased risk of uterine cancer.

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

The increased risk seems to affect women over 50, but not younger women.

If you have been diagnosed with uterine cancer or pre-cancer you should not take tamoxifen.

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.

- **References**


Aromatase Inhibitors for Lowering Breast Cancer Risk

Aromatase inhibitors (AIs) may someday prove to be as good as or even better than tamoxifen or raloxifene in reducing breast cancer risk, but they haven’t been studied as much for this use. More research is needed to see how effective they are, who would most benefit from them, and how long treatment should be continued.

What are aromatase inhibitors?

Aromatase inhibitors lower estrogen levels by stopping an enzyme in fat tissue (called aromatase) from changing other hormones into estrogen. 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 are past...
The drugs in this class include:

- Anastrozole (Arimidex)
- Exemestane (Aromasin)
- Letrozole (Femara)

Alls are pills taken once a day.

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

Alls are used mainly to treat women with hormone receptor-positive breast cancer. But large studies of anastrozole and exemestane have also found that they can lower breast cancer risk in postmenopausal women who are at increased risk.

These drugs are not yet approved in the US to lower breast cancer risk. However, some medical organizations include them as options along with tamoxifen and raloxifene to reduce breast cancer risk in women who are past menopause. 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. When used to lower the risk of breast cancer, these drugs are taken daily for 5 years.

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

The most common side effects of Alls 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, Alls tend to speed up bone thinning, which can lead to osteoporosis. People with osteoporosis are more likely to have broken bones.

Alls may raise cholesterol. Women with pre-existing coronary heart disease who take an AI may be at risk of having a heart problem.
Preventive Surgery to Reduce Breast Cancer Risk

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

For some women who have a very high risk of breast cancer, preventive surgery to remove the breasts (prophylactic mastectomy) or surgery to remove the ovaries (prophylactic oophorectomy) may be options to lower their risk.

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)
- Have a history of lobular carcinoma in situ (LCIS)
- 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, these operations 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.

**Prophylactic mastectomy**

A prophylactic mastectomy is surgery to remove one or both breasts to lower the chances of getting breast cancer. While a prophylactic mastectomy can lower this risk by 90% or more, 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.

There are two main situations in which a prophylactic mastectomy might be considered.

**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 this surgery will benefit any particular woman. For example, most women with a **BRCA1** or **BRCA2** gene mutation will develop breast cancer at some point. Having a prophylactic mastectomy before the cancer occurs 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.

**For women already diagnosed with breast cancer**

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

This is more likely to be a good option for women who 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 without a family history of breast cancer or other risk factors, the benefit of a 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, for most women it does not increase the chances of living longer.

It’s very important to talk with your health care provider so that you understand how much this type of surgery is likely to benefit you, versus the likelihood of risks and side effects. You might also want to get a second medical opinion, as well as talk to other women who have had this surgery, before deciding if it’s right for you.

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

The ovaries are the body’s main sources of estrogen, a hormone that can help some breast cancers grow. Women with a *BRCA1* or *BRCA2* mutation can reduce their risk of breast cancer by about half by having a prophylactic oophorectomy, which removes the ovaries (and usually the attached fallopian tubes as well). Some women have this surgery done along with a prophylactic mastectomy.

Women with a *BRCA1* or *BRCA2* mutation also have a high risk of developing ovarian cancer. Most doctors recommend that women with one of these mutations have their ovaries surgically removed once they finish having children to lower this risk.

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 provider 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 for breast cancer, which might include starting screening at an earlier 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 limit or avoiding alcohol. For more information, see Can I Lower My Risk of Breast Cancer?

- **References**


Breast Cancer Early Detection and Diagnosis

Can Breast Cancer Be Found Early?

Breast cancer is sometimes found after symptoms appear, but many women with breast cancer have no symptoms. This is why regular breast cancer screening is so important. Learn more.

- American Cancer Society Recommendations for the Early Detection of Breast Cancer

Imaging Tests to Find Breast Cancer

Different tests can be used to look for and diagnose breast cancer. If your doctor finds an area of concern on a screening test (a mammogram), or if you have symptoms that could mean breast cancer, you will need more tests to know for sure if it’s cancer.

- Mammograms
- Breast Ultrasound
- Breast MRI Scans
- Newer and Experimental Breast Imaging Tests

Biopsy

A biopsy is done when mammograms, other imaging tests, or a physical exam shows a breast change that may be cancer. A biopsy is the only way to know for sure if it’s cancer.

- Breast Biopsy

Tests to look for breast cancer spread
If your doctor suspects your cancer may have spread to other parts of your body, you may need more tests, such as chest x-rays, CT scans, bone scans, PET scans, or MRI scans.

- **Imaging Tests to Find Out if Breast Cancer Has Spread**

**Finding breast cancer during pregnancy**

Breast cancer during pregnancy is rare. But if you find a lump or notice any unusual changes in your breasts that concern you, tell your doctor or nurse right away.

- **Finding Breast Cancer During Pregnancy**

**American Cancer Society Recommendations for the Early Detection of Breast Cancer**

Finding breast cancer early and getting state-of-the-art cancer treatment are the most important strategies to prevent deaths from breast cancer. Breast cancer that’s found early, when it’s small and has not spread, is easier to treat successfully. Getting regular screening tests is the most reliable way to find breast cancer early. The American Cancer Society has screening guidelines for women at average risk of breast cancer, and for those at high risk for breast cancer.

**What are screening tests?**

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 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.

**American Cancer Society screenings**
recommendations for women at average breast cancer risk

These guidelines are for women at average risk for breast cancer. For screening purposes, a woman is considered to be at average risk if she doesn't have a personal history of breast cancer, a strong family history of breast cancer, or a genetic mutation known to increase risk of breast cancer (such as in a BRCA gene), and has not had chest radiation therapy before the age of 30. (See below for guidelines for women at high risk.)

Women between 40 and 44 have the option to start screening with a mammogram every year.

Women 45 to 54 should get mammograms every year.

Women 55 and older can switch to a mammogram every other year, or they can choose to continue yearly mammograms. 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 understand what to expect when getting a mammogram for breast cancer screening – what the test can and cannot do.

Mammograms

Regular mammograms can help find breast cancer at an early stage, when treatment is most 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, are less likely to need aggressive treatment like surgery to remove the breast (mastectomy) and chemotherapy, and are more likely to be cured.

Mammograms are not perfect. They miss some cancers. And sometimes a woman will need more tests 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 has not shown a clear benefit of regular physical breast exams done by either a health professional (clinical breast exams) or by yourself (breast self-exams). There is very little evidence that these tests help find breast cancer early when women also get screening mammograms. Most often when breast cancer is detected because of symptoms (such as a lump), a woman discovers the symptom during usual activities such as bathing or dressing. **Women should be familiar with how their breasts normally look and feel and report any changes to a health care provider right away.**

**American Cancer Society screening recommendations for women at high risk**

Women who are at **high risk** for breast cancer based on certain factors should get an **MRI** and a mammogram every year, typically starting at age 30. 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 (see below)
- Have a known **BRCA1** or **BRCA2** gene mutation (based on having had genetic testing)
- 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 higher lifetime risk 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 “extremely” or “heterogeneously” dense breasts 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 more likely to detect cancer than a mammogram, it may still miss some cancers that a mammogram would detect.
Most women at high risk should begin screening with MRI and mammograms when they are 30 and continue for as long as they are in good health. But a woman at high risk should make the decision to start with her health care providers, taking into account her personal circumstances and preferences.

**Tools used to assess breast cancer risk**

Several risk assessment tools 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. Two models could easily give different estimates for the same person.

Risk assessment tools that include family history in first-degree relatives (parents, siblings, and children) and second-degree relatives (such as aunts and cousins) on both sides of the family should be used 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.

- **References**


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**Mammograms**

**What is a mammogram?**
A mammogram is an x-ray of the breast that looks for changes that may be signs of breast cancer. Get the basics about mammograms.

**What to know about getting a mammogram**

Whether you’re a mammogram newbie or a veteran, knowing what to expect may help the process go more smoothly.

**Mammograms for women with breast implants**

If you have breast implants, you can and should get mammograms as recommended. But you might need to have extra pictures taken so the doctor can see as much breast tissue as possible.

**What does the doctor look for on a mammogram?**

The doctor reading your mammogram will be looking for different types of breast changes, such as small white spots called calcifications, lumps or tumors called masses, and other suspicious areas that could be signs of cancer.

**Getting called back after a mammogram**

Getting called back after a screening mammogram is fairly common and doesn’t mean you have cancer. Often, it just means more x-rays or an ultrasound needs to be done to get a closer look at an area of concern.

**Can a mammogram miss a breast cancer?**

Mammograms are the best breast cancer screening tests we have at this time. But mammography has limitations.

**Understanding your mammogram results**

Doctors use a standard system to describe mammogram findings and results. This system is called the Breast Imaging Reporting and Data System (BI-RADS).
Breast density and mammograms

The density of your breasts is important. Cancers may be harder to find on mammograms in women with dense breasts. Having dense breasts might also affect your risk of breast cancer.

Mammograms after breast cancer

Women who have had breast cancer are at higher risk of developing another breast cancer. The American Cancer Society does not have specific recommendations or guidelines for mammograms or other breast imaging tests for women who have been treated for breast cancer, but there is information about what these women will likely need to do.

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Mammogram Basics

A mammogram is a low-dose x-ray that allows doctors called radiologists to look for changes in breast tissue.

Why do I need mammograms?

A mammogram can often find or detect breast cancer early, when it’s small and even before a lump can be felt. This is when it’s easiest to treat.

What are the types of mammograms?

Screening mammograms

A screening mammogram is used to look for signs of breast cancer in women who don’t have any breast symptoms or problems. X-ray pictures of each breast are taken from 2 different angles.
Diagnostic mammograms

Mammograms can also be used to look at a woman’s breast if she has breast symptoms or if a change is seen on a screening mammogram. When used in this way, they are called diagnostic mammograms. They may include extra views (images) of the breast that aren’t part of screening mammograms. Sometimes diagnostic mammograms are used to screen women who were treated for breast cancer in the past.

What do mammograms show?

Mammograms can often show abnormal areas in the breast. They can’t prove that an abnormal area is cancer, but they can help health care providers decide whether more testing is needed. The 2 main types of breast changes found with a mammogram are calcifications and masses. Learn more about these and other breast changes in What Does the Doctor Look for on a Mammogram?

How do mammograms work?

A mammogram uses a machine designed to look only at breast tissue. The machine takes x-rays at lower doses than usual x-rays. Because these x-rays don’t go through tissue easily, the machine has 2 plates that compress or flatten the breast to spread the tissue apart. This gives a better picture and allows less radiation to be used.

To learn more about how they are done, see Mammograms: What to Know Before You Go.
In the past, mammograms were typically printed on large sheets of film. Today, digital mammograms (also known as full-field digital mammography or FFDM) are much more common. Digital images are recorded and saved as files in a computer.

A newer type of mammogram is known as breast tomosynthesis or 3D mammography. For this, the breast is compressed once, and a machine takes many low-dose x-rays as it moves over the breast. A computer then puts the images together into a 3-dimensional picture. In some cases, this uses more radiation than standard 2-view mammograms, but it may allow doctors to see the breast tissues more clearly. Some studies have suggested it might lower the chance of being called back for follow-up testing. It may also be able to find more cancers. But not all health insurance
providers may cover tomosynthesis.

Are mammograms safe?

Mammograms expose the breasts to small amounts of radiation. But the benefits of mammography outweigh any possible harm from the radiation exposure. Modern machines use low radiation doses to get breast x-rays that are high in image quality. On average the total dose for a typical mammogram with 2 views of each breast is about 0.4 millisieverts, or mSv. (A mSv is a measure of radiation dose.)

To put the dose into perspective, people in the US are normally exposed to an average of about 3 mSv of radiation each year just from their natural surroundings. (This is called background radiation.) The dose of radiation used for a screening mammogram of both breasts is about the same amount of radiation a woman would get from her natural surroundings over about 7 weeks.

If there’s any chance you might be pregnant, let your health care provider and x-ray technologist know. Although the risk to the fetus is likely very small, screening mammograms aren’t routinely done in pregnant women.

Mammograms: What to Know Before You Go

A mammogram is an important step in taking care of yourself and your breasts. Whether you’re a mammogram newbie or a veteran, knowing what to expect may help the process go more smoothly.

How to prepare for your mammogram

- If you have a choice, use a facility that specializes in mammograms and does many mammograms a day.
- Try to go to the same facility every time so that your mammograms can easily be compared from year to year.
- If you’re going to a facility for the first time, bring a list of the places and dates of mammograms, biopsies, or other breast treatments you’ve had before.
- If you’ve had mammograms at another facility, try to get those records to bring with you to the new facility (or have them sent there) so the old pictures can be
compared to the new ones.

- Schedule your mammogram when your breasts are not tender or swollen to help reduce discomfort and get good pictures. Try to avoid the week just before your period.
- On the day of the exam, don’t wear deodorant or antiperspirant. Some of these contain substances that can show up on the x-ray as white spots. If you’re not going home afterward, you might want to take your deodorant with you to put on after your exam.
- You might find it easier to wear a skirt or pants, so that you’ll only need to remove your top and bra for the mammogram.
- Discuss any recent changes or problems in your breasts with your health care provider before getting the mammogram.

Don’t be afraid of mammograms! Remember that only 2 to 4 screening mammograms in 1,000 lead to a diagnosis of breast cancer.

**Tips for getting a mammogram**

These tips can help you have a good quality mammogram:

- Always describe any breast changes or problems you’re having to the technologist doing the mammogram. Also describe any medical history that could affect your breast cancer risk—such as surgery, hormone use, breast cancer in your family, or if you’ve had breast cancer before.
- Before getting any type of imaging test, tell the technologist if you’re breastfeeding or if you think you might be pregnant.

**What to expect when getting a screening mammogram**

- You’ll have to undress above the waist to get a mammogram. The facility will give you a wrap to wear.
- A technologist will position your breasts for the mammogram. You and the technologist are the only ones in the room during the mammogram.
- To get a high-quality picture, your breast must be flattened. The technologist places your breast on the machine’s plate. The plastic upper plate is lowered to compress your breast for a few seconds while the technologist takes a picture.
- The whole procedure takes about 20 minutes. The actual breast compression only lasts a few seconds.
You might feel some discomfort when your breasts are compressed, and for some women it can be painful. Tell the technologist if it hurts.

Two views of each breast are taken for a screening mammogram. But for some women, such as those with breast implants or large breasts, more pictures may be needed.

**What to expect when getting a diagnostic mammogram**

A diagnostic mammogram is often done if a woman has breast symptoms or if a change is seen on a screening mammogram.

- More pictures are taken during a diagnostic mammogram with a focus on the area that looked different on the screening mammogram.
- During a diagnostic mammogram, the images are checked by the radiologist while you’re there so that more pictures can be taken if needed to look more closely at any area of concern.
- In some cases, special images known as spot views or magnification views are used to make a small area of concern easier to see.

**How will I get my mammogram results?**

If you don’t hear from your health care provider within 10 days, do not assume that your mammogram was normal. Call your provider or the facility where the mammogram was done.

A full report of the results of your mammogram will be sent to your health care provider. Mammography clinics also must mail women an easy-to-understand summary of their mammogram results within 30 days—or “as quickly as possible” if the results suggest cancer is present. This means you could get the results before your provider calls you. If you want the full written mammogram report as well as the summary, you’ll need to ask for it. We can help you learn more about [how to understand your mammogram report](#).

**What Does the Doctor Look for on a Mammogram?**
A radiologist will look at your mammogram. Radiologists are doctors who diagnose diseases and injuries using imaging tests such as x-rays.

When possible, the doctor reading your mammogram will compare it to your old mammograms. This can help show if any findings are new, or if they were already there on previous mammograms. Findings that haven't changed from older mammograms aren't likely to be cancer, which might mean you won't need further tests.

The doctor reading your mammogram will be looking for different types of breast changes, such as small white spots called calcifications, lumps or tumors called masses, and other suspicious areas that could be signs of cancer.

**Calcifications**

Calcifications are tiny calcium deposits within the breast tissue. They look like small white spots on a mammogram. They may or may not be caused by cancer. There are 2 types of calcifications.

**Macrocalcifications**

Macrocalcifications are larger calcium deposits that are most likely due to changes caused by aging of the breast arteries, old injuries, or inflammation. These deposits are typically related to non-cancerous conditions and don't need to be checked for cancer with a biopsy. Macrocalcifications become more common as women get older (especially after age 50).

**Microcalcifications**

Microcalcifications are tiny specks of calcium in the breast. When seen on a mammogram, they are more of a concern than macrocalcifications, but they don't always mean that cancer is present. The shape and layout of microcalcifications help the radiologist judge how likely it is that the change is due to cancer.

In most cases, microcalcifications don't need to be checked with a biopsy. But if they have a suspicious look and pattern, a biopsy will be recommended to check for cancer.

**A mass**

A mass is the same as a lump or a tumor. With or without calcifications, it's another
important change seen on a mammogram. Masses can be many things, including cysts (non-cancerous, fluid-filled sacs) and non-cancerous solid tumors (such as fibroadenomas), but they may also be a sign of cancer.

Cysts are fluid-filled sacs. Simple cysts (fluid-filled sacs with thin walls) are not cancer and don’t need to be checked with a biopsy. If a mass is not a simple cyst, it’s of more concern, so a biopsy might be needed to be sure it isn’t cancer.

Solid tumors can be more concerning, but most breast tumors are not cancer.

A cyst and a solid tumor can feel the same. They can also look the same on a mammogram. The doctor must be sure it’s a cyst to know it’s not cancer. To be sure, a breast ultrasound is often done because it is a better tool to see fluid-filled sacs. Another option is to use a thin needle to remove (aspirate) fluid from the area.

If a mass is not a simple cyst (that is, if it’s at least partly solid), more imaging tests might be needed to decide if it could be cancer. Some masses can be watched over time with regular mammograms or ultrasound to see if they change, but others may need to be checked with a biopsy. The size, shape, and margins (edges) of the mass may help the radiologist decide how likely it is to be cancer.

Breast density

Your mammogram report will also contain an assessment of your breast density. Breast density is based on how fibrous and glandular tissues are distributed in your breast, as opposed to how much of your breast is made up of fatty tissue.

Dense breasts are not abnormal, but they are linked to a higher risk of breast cancer. Dense breast tissue can also make it harder to find cancers on a mammogram. Still, experts don’t agree what other tests, if any, should be done along with mammograms in women with dense breasts who aren’t in a breast cancer high-risk group (based on gene mutations, breast cancer in the family, or other factors).

Getting Called Back After a Mammogram

Getting called back after a screening mammogram is fairly common and doesn’t mean you have breast cancer. In fact, fewer than 1 in 10 women called back for more tests
are found to have cancer. Often, it just means more x-rays or an ultrasound needs to be done to get a closer look at an area of concern.

Getting called back is more common after a first mammogram, or when there’s no previous mammogram to compare the new mammogram with. It's also more common in women who haven’t gone through menopause.

**What else could it be?**

You could be called back after your mammogram because:

- The pictures weren’t clear or didn’t show some of your breast tissue and need to be retaken.
- You have **dense breast tissue**, which can make it hard to see some parts of your breasts.
- The radiologist sees calcifications or a mass (a cyst or solid tumor).
- The radiologist sees an area that just looks different from other parts of the breast. Sometimes when more x-rays are taken of the area or mass, or the area is compressed more, it no longer looks suspicious. In fact, most repeat mammograms do not find cancer.

**What will happen at the follow-up appointment?**

- You’ll likely have another mammogram called a **diagnostic mammogram**. (Your previous mammogram was called a **screening mammogram**.) A diagnostic mammogram is done just like a screening mammogram, but more pictures are taken so that any areas of concern can be carefully studied. A radiologist is on hand to advise the technologist (the person who operates the mammogram machine) to be sure they have all the images that are needed.
- You may also have an **ultrasound** test, which uses sound waves to make pictures of the inside of your breast at the area of concern.
- Some women may need a **breast MRI**. For this test, you'll lie face down inside a narrow tube for up to an hour while the machine creates more detailed images of the breast tissues. MRI is painless, but it can be uncomfortable for people who don’t like small, tight spaces.

You can expect to learn the results of your tests during the visit. You are likely to be told one of the following:
• The suspicious area turned out to be nothing to worry about and you can return to your normal mammogram schedule.
• The area is probably nothing to worry about, but you should have your next mammogram sooner than normal – usually in 6 months – to watch it closely and make sure it's not changing over time.
• The changed area could be cancer, so you will need to have a biopsy to know for sure.

You’ll also get a letter with a summary of the findings that will tell you if you need more tests and/or when you should schedule your next mammogram.

What if I need a biopsy?

During a breast biopsy, a small piece of breast tissue is removed and checked for cancer under a microscope. Even if you need a biopsy, it doesn’t mean you have cancer. Most biopsy results are not cancer, but a biopsy is the only way to find out.

There are several different types of biopsies, some of which are done using a needle and some that are done through a cut in the skin. The type you have depends on things like how suspicious the tumor looks, how big it is, where it is in the breast, how many tumors there are, other medical problems you might have, and your personal preferences.

How can I stay calm while waiting?

Waiting for appointments and the results of tests can be frightening. Many women have strong emotions including disbelief, anxiety, fear, anger, and sadness during this time. Here are some things to remember:

• It’s normal to have these feelings.
• Most breast changes are not cancer and are not life-threatening.
• Talking with a loved one or a counselor about your feelings may help.
• Talking with other women who have been through a breast biopsy may help.
• The American Cancer Society is available at 1-800-227-2345 around the clock to answer your questions and provide support.

What if it’s cancer?
If you do have cancer and you’re referred to a breast specialist, use these tips to make your appointment as useful as possible:

- Make a list of questions to ask.
- Take a family member or friend with you. They can serve as an extra pair of ears, take notes, help you remember things later, and give you support.
- Ask if you can record the conversations.
- Take notes. If someone uses a word you don’t know, ask them to spell it and explain it.
- Ask the doctors or nurses to explain anything you don’t understand.

Understanding Your Mammogram Report

A doctor called a radiologist will categorize your mammogram results using a number system of 0 through 6. You should talk to your doctor about your mammogram’s category and what you need to do next.

What is a BI-RADS assessment category?

Doctors use a standard system to describe mammogram findings and results. This system (called the Breast Imaging Reporting and Data System or BI-RADS) sorts the results into categories numbered 0 through 6.

By sorting the results into these categories, doctors can describe what they find on a mammogram using the same words and terms. This makes accurately communicating about these test results and following up after the tests much easier.

What do the BI-RADS categories mean?

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
<th>What it means</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Additional imaging evaluation and/or comparison to prior mammograms</td>
<td>This means the radiologist may have seen a possible abnormality, but it was not clear and you will need more tests, such as another mammogram with the use of spot compression (applying compression to a smaller area when doing the mammogram), magnified views, special mammogram views, or ultrasound. This may also suggest that the radiologist wants to compare your new mammogram with older ones to see if there have been changes in the area over time.</td>
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<tr>
<td></td>
<td>Is needed.</td>
<td></td>
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<td>---------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Negative</td>
<td>There’s no significant abnormality to report. Your breasts look the same (they are symmetrical) with no masses (lumps), distorted structures, or suspicious calcifications. In this case, negative means nothing bad was found.</td>
</tr>
<tr>
<td>2</td>
<td>Benign (non-cancerous) finding</td>
<td>This is also a negative mammogram result (there's no sign of cancer), but the radiologist chooses to describe a finding known to be benign, such as benign calcifications, lymph nodes in the breast, or calcified fibroadenomas. This ensures that others who look at the mammogram will not misinterpret the benign finding as suspicious. This finding is recorded in your mammogram report to help when comparing to future mammograms.</td>
</tr>
<tr>
<td>3</td>
<td>Probably benign finding – Follow-up in a short time frame is suggested</td>
<td>The findings in this category have a very high chance (greater than 98%) of being benign (not cancer). The findings are not expected to change over time. But since it’s not proven to be benign, it’s helpful to see if the area in question does change over time. You will likely need follow-up with repeat imaging in 6 months and regularly after that until the finding is known to be stable (usually at least 2 years). This approach helps avoid unnecessary biopsies, but if the area does change over time, it still allows for early diagnosis.</td>
</tr>
<tr>
<td>4</td>
<td>Suspicious abnormality – Biopsy should be considered</td>
<td>Findings do not definitely look like cancer but could be cancer. The radiologist is concerned enough to recommend a biopsy. The findings in this category can have a wide range of suspicion levels. For this reason, some, but not all, doctors divide this category further: 4A: Finding with a low suspicion of being cancer 4B: Finding with an intermediate suspicion of being cancer 4C: Finding of moderate concern of being cancer, but not as high as Category 5</td>
</tr>
<tr>
<td>5</td>
<td>Highly suggestive of malignancy – Appropriate action should be taken</td>
<td>The findings look like cancer and have a high chance (at least 95%) of being cancer. Biopsy is very strongly recommended.</td>
</tr>
<tr>
<td>6</td>
<td>Known biopsy-proven malignancy – Appropriate action should be taken</td>
<td>This category is only used for findings on a mammogram that have already been shown to be cancer by a previous biopsy. Mammograms may be used in this way to see how well the cancer is responding to treatment.</td>
</tr>
</tbody>
</table>

**BI-RADS reporting breast density**
Your mammogram report will also include an assessment of your breast density, which is a description of how much fibrous and glandular tissue is in your breasts, as opposed to fatty tissue. The denser your breasts, the harder it can be to see abnormal areas on mammograms.

BI-RADS classifies breast density into 4 groups, which are described in Breast Density and Your Mammogram Report.

Breast Density and Your Mammogram Report

Regular mammograms are the best way to find breast cancer early. But if your mammogram report says that you have dense breast tissue, you may be wondering what that means. **Having dense breasts is very common and is not abnormal.**

What is dense breast tissue?

Breasts are made up of lobules, ducts, and fatty and fibrous connective tissue.

- Lobules produce milk and are often called glandular tissue.
- Ducts are the tiny tubes that carry milk from the lobules to the nipple.
- Fibrous tissue and fat give breasts their size and shape and hold the other tissues in place.

Your breasts will be seen as dense if you have a lot of fibrous or glandular tissue and not much fat in the breasts. Some women have more dense breast tissue than others. For most women, breasts become less dense with age. But in some women, there’s little change.
How do I know if I have dense breasts?

Breast density is seen only on mammograms. Some women think that because their breasts are firm, they are dense. But breast density isn’t based on how your breasts feel. It’s not related to breast size or firmness.

Radiologists are the doctors who “read” x-rays like mammograms. They check your mammogram for abnormal areas, and also look at breast density.

Breast density categories

Radiologists use the Breast Imaging Reporting and Data System, or BI-RADS, to
classify breast density into 4 categories. They go from almost all fatty tissue to extremely dense tissue with very little fat.

Breasts are almost all fatty tissue.
There are scattered areas of dense glandular and fibrous tissue.
More of the breast is made of dense glandular and fibrous tissue (described as "heterogenously dense"). This can make it hard to see small tumors in or around the dense tissue.
Breasts are extremely dense, which makes it hard to see tumors in the tissue.

Some mammogram reports sent to women mention breast density. Your health care provider can also tell you if your mammogram shows that you have dense breasts.

In some states, women whose mammograms show heterogenously dense or extremely dense breasts must be told that they have dense breasts in the summary of the mammogram report that is sent to patients (sometimes called the lay summary).

The language used is mandated by each law, and may say something like this:

“This mammogram shows that your breast tissue is dense. Dense breast tissue is common and is not abnormal. However, dense breast tissue can make it harder to evaluate the results of your mammogram and may also be associated with an increased risk of breast cancer. This information about the results of your mammogram is given to you so you will be informed when you talk with your doctor. Together, you can decide which screening options are right for you. A report of your results was sent to your primary physician.”

Why is breast density important?
Women who have dense breast tissue seem to have a slightly higher risk of breast cancer compared to women with less dense breast tissue. It’s unclear at this time why dense breast tissue is linked to breast cancer risk.

We do know that dense breast tissue makes it harder for radiologists to see cancer. On mammograms, dense breast tissue looks white. Breast masses or tumors also look white, so the dense tissue can hide some tumors. In contrast, fatty tissue looks almost black. On a black background it’s easier to see a tumor that looks white. So, mammograms can be less accurate in women with dense breasts.

**If I have dense breasts, do I still need mammograms?**

Yes. Most breast cancers can be seen on a mammogram even in women who have dense breast tissue, so it’s still important to get regular mammograms. Mammograms can help save women’s lives.

Even if you have a normal mammogram result (regardless of how dense your breasts are), you should know how your breasts normally look and feel. Anytime there’s a change, you should report it to a health care provider right away.

**Should I have any other screening tests if I have dense breast tissue?**

At this time, experts do not agree what other tests, if any, women with dense breasts should get in addition to mammograms.

Studies have shown that breast ultrasound and magnetic resonance imaging (MRI) can help find some breast cancers that can’t be seen on mammograms. But MRI and ultrasound both show more findings that turn out not to be cancer. This can lead to more tests and unnecessary biopsies. And the cost of ultrasound and MRI may not be covered by insurance.

Talk to your health care provider about whether you should have other tests.

**What should I do if I have dense breast tissue?**

If your mammogram report says that you have dense breast tissue, talk with your provider about what this means for you. Be sure that your doctor or nurse knows your
medical history and if there’s anything else in your history that increases your risk for breast cancer.

Any woman who’s already in a high-risk group (based on gene mutations, a strong family history of breast cancer, or other factors) should have an MRI along with her yearly mammogram.

To learn more about breast cancer risk factors, see Breast Cancer Risk and Prevention. To find out if you’re in a higher-risk group for breast cancer, see American Cancer Society Recommendations for the Early Detection of Breast Cancer.

- References


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Limitations of Mammograms

Mammograms are the best breast cancer screening tests we have at this time. But mammograms have their limits. For example, they aren’t 100% accurate in showing if a woman has breast cancer:

- A false-negative mammogram looks normal even though breast cancer is present.
A false-positive mammogram looks abnormal even though there’s no cancer in the breast.

**False-negative results**

A false-negative mammogram looks normal even though breast cancer is present. Overall, screening mammograms do not find about 1 in 5 breast cancers.

- Women with dense breasts have more false-negative results.
- Breasts often become less dense as women age, so false negatives are more common in younger women.
- False-negative mammograms can give women a false sense of security, thinking that they don't have breast cancer when in fact they do.

**False-positive results**

A false-positive mammogram looks abnormal even though no cancer is actually present. Abnormal mammograms require extra testing (diagnostic mammograms, ultrasound, and sometimes MRI or even a breast biopsy) to find out if the change is cancer.

- False-positive results are more common in women who are younger, have dense breasts, have had breast biopsies, have breast cancer in the family, or are taking estrogen.
- About half of the women getting annual mammograms over a 10-year period will have a false-positive finding.
- The odds of a false-positive finding are highest for the first mammogram. Women who have past mammograms available for comparison reduce their odds of a false-positive finding by about 50%.
- False-positive mammograms can cause anxiety. They can also lead to extra tests to be sure cancer isn’t there, which cost time and money and maybe even physical discomfort.

**Mammograms might not be helpful for all women**

The value of a screening mammogram depends on a woman’s overall health. Finding breast cancer early may not help her live longer if she has other serious or life-
threatening health problems, such as serious heart disease, or severe kidney, liver, or lung disease. The American Cancer Society breast cancer screening guidelines emphasize that women with serious health problems or short life expectancies should discuss with their doctors whether they should continue having mammograms. Our guidelines also stress that age alone should not be the reason to stop having regular mammograms.

It’s important to know that even though mammograms can often find breast cancers that are too small to be felt, treating a small tumor does not always mean it can be cured. A fast-growing or aggressive cancer might have already spread.

**Overdiagnosis and overtreatment**

Screening mammograms can find invasive breast cancer and ductal carcinoma in situ (DCIS, cancer cells in the lining of breast ducts) that need to be treated. But it’s possible that some of the invasive cancers and DCIS found on mammograms would never grow or spread. (Finding and treating cancers that would never cause problems is called overdiagnosis.) These cancers are not life-threatening, and never would have been found or treated if the woman had not gotten a mammogram. The problem is that doctors can’t tell these cancers from those that will grow and spread.

Overdiagnosis leads to some women getting treatment that’s not really needed (overtreatment), because the cancer never would have caused any problems. Doctors don’t know which women fall into this group when the cancer is found because they can’t tell which cancers will be life-threatening and which won’t ever cause problems. Because of this, all cases are treated. This exposes some women to the adverse effects of cancer treatment that’s really not needed.

Still, overdiagnosis is not thought to happen that often. There’s a wide range of estimates of the percentage of breast cancers that might be overdiagnosed by mammography, but the most credible estimates range from 1% to 10%.

**Radiation exposure**

Because mammograms are x-ray tests, they expose the breasts to radiation. The amount of radiation from each mammogram is low, but it can still add up over time. For more on this, see Mammogram Basics.

**Having a Mammogram After You’ve Had**
Breast Cancer Surgery

There are many different kinds of breast cancer surgery. The type of surgery you have had will determine whether you need to get mammograms in the future. If you have had breast-conserving surgery (BCS), you need to continue to get mammograms. If you have had a mastectomy, you may not need a mammogram.

If you had surgery (of any type) on only one breast, you will still need to get mammograms of the unaffected breast. This is very important, because women who have had one breast cancer are at higher risk of developing a new cancer in the other breast.

While the American Cancer Society does not have specific guidelines for mammograms or other breast imaging in women who have been treated for breast cancer, there is information available about what these women will probably need to do.

Mammograms after breast-conserving surgery

Most experts recommend that women who have had breast-conserving surgery or BCS (sometimes called a partial mastectomy or lumpectomy) get a mammogram of the treated breast 6 to 12 months after radiation treatment ends. Surgery and radiation both cause changes in the skin and breast tissues that will show up on the mammogram, making it harder to read. The mammogram done at this time serves as a new baseline for the affected breast. Future mammograms will be compared with this one, to help the doctor check on healing and look for signs that the cancer has come back (recurred).

You should have follow-up mammograms of the treated breast at least yearly after that, but some doctors may recommend that you have mammograms more often. You will still need to have routine mammograms on the opposite (untreated) breast as well.

Mammograms after mastectomy

Women who have had a mastectomy (including simple mastectomy, modified radical mastectomy, and radical mastectomy) to treat breast cancer need no further routine screening mammograms on the affected side. If both breasts are removed (a double or bilateral mastectomy), they don’t need mammograms at all. There isn’t enough tissue remaining after these kinds of mastectomies to do a mammogram. Cancer can come back in the skin or chest wall on that side, but it can be found on a physical exam.
It’s possible for women with **reconstructed breasts** to get mammograms, but experts agree that women who have breast reconstruction after a simple, modified radical, or radical mastectomy don’t need routine mammograms. Still, if an area of concern is found during a physical exam on a woman who has had breast reconstruction, a diagnostic mammogram may be done. **Breast ultrasound** or **MRI** may also be used to look at the area closely.

Women who have had a **subcutaneous mastectomy**, also called skin-sparing mastectomy, still need follow-up mammograms. In this surgery, the woman keeps her nipple and the tissue just under the skin. Often, an implant is put under the skin. This surgery leaves behind enough breast tissue to require yearly screening mammograms in these women.

Any woman who’s not sure what type of mastectomy she has had or whether she needs to get mammograms should ask her doctor.

**Mammograms for Women with Breast Implants**

If you have breast implants, you should still get regular screening mammograms **as recommended**.

It’s important to tell the technologist you have implants before your mammogram is started. In fact, it’s best to mention this when you make the appointment to have your mammogram done. This way you can find out if the facility has experience doing mammograms in women with breast implants.

You should be aware that it might be hard for the doctor to see certain parts of your breast. The x-rays used in mammograms cannot go through silicone or saline implants well enough to show the breast tissue under them. This means that part of the breast tissue can be hard to see on a mammogram.

To help the doctor can see as much breast tissue as possible, women with implants have 4 extra pictures done (2 on each breast), as well as the 4 standard pictures taken during a screening mammogram. In these extra pictures, called **implant displacement** (ID) views, the implant is pushed back against the chest wall and the breast is pulled forward over it. This allows better imaging of the front part of each breast.

Implant displacement views are harder to do and can be uncomfortable if the woman
has had a lot of scar tissue (called *contractures*) form around the implants. ID views are easier in women whose implants were placed underneath (behind) the chest muscles.

Very rarely, mammograms can rupture an implant. This is another important reason to make sure the mammography facility knows you have implants.

**Breast Ultrasound**

Breast ultrasound is often used to examine some types of breast changes.

**When is breast ultrasound used?**

Ultrasound is useful for looking at some breast changes, such as lumps (especially those that can be felt but not seen on a mammogram) or changes in women with dense breast tissue. It also can be used to look at a change that was seen on a mammogram.

Ultrasound is useful because it can often tell the difference between fluid-filled cysts (which are very unlikely to be cancer) and solid masses (which might need further testing to be sure they’re not cancer).

Ultrasound can also be used to help guide a biopsy needle into an area so that cells can be taken out and tested for cancer. This can also be done in swollen lymph nodes under the arm.

Ultrasound is widely available, easy to have, and does not expose a person to radiation. It also costs less than a lot of other options.

**How is it done?**

Breast ultrasound uses sound waves to make a computer picture of the inside of the breast.

A gel is put on the skin of the breast, and a wand-like instrument called a transducer is moved over the skin. The transducer sends out sound waves and picks up the echoes as they bounce off body tissues. The echoes are made into a picture on a computer screen. You might feel some pressure as the transducer is moved across the breast, but it should not be painful.
**Automated ultrasound** is an option that uses a much larger transducer to take hundreds of images that cover nearly the entire breast. When automated ultrasound is used, a second handheld ultrasound is often needed to get more pictures of suspicious areas.

- **References**


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**Breast MRI Scans**

Breast MRI (magnetic resonance imaging) uses radio waves and strong magnets to make detailed pictures of the inside of the breast.

**When is breast MRI used?**

Breast MRI is often used in women who already have been diagnosed with breast cancer, to help measure the size of the cancer, look for other tumors in the breast, and to check for tumors in the opposite breast.

For certain women [at high risk for breast cancer](https://www.cancer.org/cancer/breast-cancer/causes-risks-prevention/high-risk-breast-cancer.html), a screening MRI is recommended along with a yearly mammogram. MRI is not recommended as a screening test by itself because it can miss some cancers that a mammogram would find.

Although MRI can find some cancers not seen on a mammogram, it’s also more likely to find something that turns out not to be cancer (called a false positive). False-positive findings have to be checked out to know that cancer isn’t present. This can mean more tests and/or [biopsies](https://www.cancer.org/cancer/breast-cancer/causes-risks-prevention/breast-cancer-screening.html). This is why MRI is not recommended as a screening test for women [at average risk of breast cancer](https://www.cancer.org/cancer/breast-cancer/causes-risks-prevention/average-risk-breast-cancer.html), because it would result in unneeded biopsies.
What you need to know about getting a breast MRI

Just as mammograms are done using x-ray machines specially designed for the breasts, breast MRI also requires special equipment. This MRI machine is called an MRI with dedicated breast coils. Not all hospitals and imaging centers have dedicated breast MRI equipment. If you are having a screening MRI, it's important to have it at a facility with dedicated equipment, and that can do an MRI-guided breast biopsy (or partners with a facility that can).

MRI uses strong magnets instead of radiation to make very detailed, cross-sectional pictures of the body. An MRI scan takes pictures from many angles, as if someone were looking at a slice of your body from the front, from the side, or from above your head. MRI creates pictures of soft tissue parts of the body that are sometimes hard to see using other imaging tests.

Tips for getting ready for the test

Check with your insurance company before getting an MRI: Breast MRI costs a lot, and it may need to be approved by your insurance company before the scan is done. Most private insurance plans that pay for mammogram screening also pay for MRI as a screening test if a woman can be shown to be at high risk. It might help to go to a center with a high-risk clinic, where the staff has experience getting approval for breast MRIs.

Follow all instructions: You don’t usually need a special diet or preparation before an MRI, but follow any instructions you’re given.

If you have trouble with enclosed spaces: If being in an enclosed space is a problem for you (you have claustrophobia), you might need to take medicine to help you relax while in the scanner. Talking with the technologist or a patient counselor, or getting a tour of the MRI machine before the test can also help. You'll be in the exam room alone, but you can talk to the MR technologist, who can see and hear what’s going on. In some cases, you may be able to have the test done with an open MRI machine that allows more space around your body.

Remove metal objects: Before the test, you'll be asked to undress and put on a gown or other clothes without zippers or metal. Be sure to remove any metal objects you can, like hair clips, jewelry, dental work, and body piercings.
If you have metal in your body: Before the scan, the technologist will ask you if you have any metal in your body. Some metallic objects will not cause problems, but others can.

If you have any of these types of medical implants, you should not even enter the MRI scanning area unless you’re told it’s OK to do so by a radiologist or technologist:

- An implanted defibrillator or pacemaker
- Clips used on a brain aneurysm
- A cochlear (ear) implant
- Metal coils inside blood vessels

What’s it like to get a breast MRI?
MRI (magnetic resonance imaging) scans are usually done on an outpatient basis in a hospital or clinic. You’ll lie face down on a narrow, flat table. Your breasts will hang down into an opening in the table so they can be scanned without being compressed. The technologist may use pillows to make you comfortable and help keep you from moving. The table then slides into a long, narrow cylinder.

The test is painless, but you have to lie still inside the narrow cylinder. You may be asked to hold your breath or keep very still during certain parts of the test. The machine may make loud, thumping, clicking, and whirring noises, much like the sound of a washing machine, as the magnet switches on and off. Some facilities give you earplugs or headphones with music to help block noise out during testing.

The most useful MRI exams for breast imaging use a contrast material that’s injected into a vein in the arm before or during the exam. This helps to clearly show breast tissue details. The contrast material used for an MRI exam is called gadolinium. (It’s not the same as the contrast dye used in CT scans.) Let the technologist know if you have any kind of allergies or have had problems before with any contrast or dye used in imaging tests.

It’s important to stay very still while the images are being made, which only takes a few minutes at a time. Tell the technologist if you need to move or take a break.

Breast MRI scans can usually take between 45 and 60 minutes. After the test, you may be asked to wait while the pictures are checked to see if more are needed.

- References


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Newer and Experimental Breast Imaging
Tests

Newer types of tests are being developed for breast imaging. Some of these are already being used in certain situations, while others are still being studied. It will take time to see if any are as good as or better than those used today.

A newer type of mammogram is known as **breast tomosynthesis** or **3D mammography**. For this test, a machine takes many low-dose x-rays as it moves over the breast. A computer then puts the images together into a 3-dimensional picture. For more on this test, see [Mammogram Basics](#).

**Optical imaging tests** pass light into the breast and then measure the light that returns or passes through the tissue. The technique does not use radiation and does not require breast compression. Studies going on now are looking at combining optical imaging with other tests like [MRI](#), [ultrasound](#), or 3D mammography to help look for breast cancer.

**Molecular breast imaging (MBI)** is a newer **nuclear medicine imaging test** for the breast. A radioactive chemical is injected into the blood, and a special camera is used to see it in the breast. This test is being studied mainly as a way to follow up breast problems (such as a lump or an abnormal mammogram). It’s also being studied as a test that can be used along with mammograms to look for cancer in women with [dense breasts](#). One potential drawback is that it exposes the whole body to radiation, so it’s unlikely this test would be used for screening every year.

**Positron Emission Mammography (PEM)** is a newer imaging test of the breast. A form of sugar attached to a radioactive particle is injected into the blood to detect cancer cells. The PEM scanner is approved by the Food and Drug Administration (FDA). Working much like a [PET scan](#), a PEM scan may be better able to detect small clusters of cancer cells within the breast. Right now it’s being studied in women with breast cancer or other breast problems to see if it can show which lumps are cancer. As with MBI, it exposes the whole body to radiation, so it’s unlikely to be a test that could be used every year for breast cancer screening.

**Electrical impedance imaging (EIT)** scans the breast for electrical conductivity. It's based on the idea that breast cancer cells conduct electricity differently from normal cells. The test passes a very small electrical current through the breast and then detects it on the skin of the breast. This is done using small electrodes that are taped to the skin. EIT does not use radiation or compress the breasts. This test is approved by the FDA to help classify tumors found on mammograms. But at this time there hasn’t been enough clinical testing to use it for breast cancer screening.
Elastography is a test that can be done as part of an ultrasound exam. It’s based on the idea that breast cancers tend to be firmer and stiffer than the surrounding breast tissue. For this test, the breast is compressed slightly, and the ultrasound can show how firm a suspicious area is. This test could be useful in telling if the area is more likely to be cancer or a benign (non-cancerous) tumor.

- **References**


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**Breast Biopsy**

When other tests show that you might have breast cancer, you will probably need to have a biopsy. Needing a breast biopsy doesn’t necessarily mean you have cancer.
Most biopsy results are not cancer, but a biopsy is the only way to find out. During a biopsy, a doctor will remove cells from the suspicious area so they can be looked at in the lab to see if cancer cells are present.

There are different kinds of breast biopsies. Some use a needle, and some use an incision (cut in the skin). Each has pros and cons. The type you have depends on a number of things, like:

- How suspicious the breast change looks
- How big it is
- Where it is in the breast
- If there is more than one
- Other medical problems you might have
- Your personal preferences

Ask the doctor which type of biopsy you will have and what you can expect during and after the procedure. It’s important to ask questions if there’s anything you’re not sure about. Get a detailed list of questions to ask your doctor before getting a breast biopsy.

If the doctor thinks you don’t need a biopsy, but you still feel there’s something wrong with your breast, follow your instincts. Don’t be afraid to talk to the doctor about this or go to another doctor for a second opinion. A biopsy is the only sure way to diagnose breast cancer.

Regardless of what type of biopsy you have, the biopsy samples will be sent to a lab where a specialized doctor called a pathologist will look at them. It typically will take at least a few days for you to find out the results.

**Fine needle aspiration (FNA) biopsy**

In an FNA biopsy, a very thin, hollow needle attached to a syringe is used to withdraw (aspirate) a small amount of tissue from a suspicious area. The needle used for an FNA biopsy is thinner than the one used for blood tests.

**Core needle biopsy**

A core biopsy uses a larger needle to sample breast changes felt by the doctor or seen on an ultrasound, mammogram, or MRI.
Surgical (open) biopsy

In rare cases, surgery is needed to remove all or part of the lump for testing. This is called a surgical or open biopsy. Most often, the surgeon removes the entire mass or abnormal area as well as a surrounding margin of normal breast tissue.

There are 2 types of surgical biopsies:

- An incisional biopsy removes only part of the suspicious area, enough to make a diagnosis.
- An excisional biopsy removes the entire tumor or abnormal area, with or without trying to take out an edge of normal breast tissue (depending on the reason for the biopsy).

Lymph node biopsy

The doctor may also need to biopsy the lymph nodes under the arm to check them for cancer spread. This might be done at the same time as biopsy of the breast tumor, or when the breast tumor is removed at surgery. This is done by needle biopsy, or with a sentinel lymph node biopsy and/or an axillary lymph node dissection.

Questions to Ask Before a Breast Biopsy

There are different types of breast biopsies. It's important to understand the type of biopsy you'll have and what you can expect during and after the biopsy.

Here are some questions you might want to ask before having a breast biopsy:

- What type of biopsy do you think I need? Why?
- Will the size of my breast affect the way the biopsy is done?
- Where will you do the biopsy?
- What exactly will you do?
• How much breast tissue will you remove?
• How long will it take?
• Will I be awake or asleep during the biopsy?
• Will I need someone to help me get home afterward?
• If you can’t feel the abnormal area in my breast, how will you find it?
• If you are using a guide wire to help find the abnormal area, how will you make sure it’s in the right place (with ultrasound or a mammogram)?
• Will I have a hole there? Will it show afterward?
• Will my breast have a different shape or look different afterward?
• Will you put a clip or marker in my breast?
• Will I have a scar? Where will it be? What will it look like?
• Will I have bruising or changes in the color of my skin? If so, how long will it last?
• Will I be sore? If so, how long will it last?
• When can I take off the bandage?
• When can I take a shower or bath?
• Will I have stitches? Will they dissolve or will I need to come back to the office and have them removed?
• When can I go back to work? How will I feel when I do?
• Will my activities be limited? Can I lift things? Care for my children?
• How soon will I know the biopsy results?
• Should I call you or will you call me with the results?
• Will you or someone else explain the biopsy results to me?

Fine Needle Aspiration Biopsy of the Breast

If other tests show you might have breast cancer, your doctor may refer you for a fine needle aspiration (FNA) biopsy. During this procedure, a small amount of tissue is taken from the suspicious area, and checked for cancer cells.

What is an FNA breast biopsy?

In an FNA biopsy, the doctor uses a very thin, hollow needle attached to a syringe to
withdraw (aspirate) a small amount of tissue or fluid from a suspicious area. The biopsy sample is then checked to see if there are cancer cells in it.

If the area to be biopsied can be felt, the needle can be guided into it while the doctor is feeling it.

**Fine needle aspiration using ultrasound**

If the lump can't be felt easily, the doctor might watch the needle on an ultrasound screen as it moves toward and into the area. This is called an ultrasound-guided biopsy.
What should you expect if you have a FNA?

During an FNA

An FNA is an outpatient procedure most often done in the doctor’s office. Your doctor may or may not use a numbing medicine (called a local anesthetic). But, the needle used for the biopsy is so thin that getting an anesthetic might hurt more than the biopsy itself.

You’ll lie on your back for the FNA, and you will have to be still while it’s being done.

If ultrasound is used, you may feel some pressure from the ultrasound wand and as the needle is put in. Once the needle is in the right place, the doctor will use the syringe to pull out a small amount of tissue and/or fluid. This might be repeated a few times. Once the biopsy is done, the area is covered with a sterile dressing or bandage.

Getting each biopsy sample usually takes about 15 seconds. The entire procedure from start to finish generally takes around 20 to 30 minutes if ultrasound is used.

After an FNA

Your doctor or nurse will tell you how to care for the biopsy site and what you can and can’t do while it heals. Biopsies can sometimes cause bleeding and lead to swelling. This can make it seem like the breast lump is larger after the biopsy. Most often, this is nothing to worry about, and the bleeding, bruising, and swelling go away over time.

What does an FNA show?

A doctor called a pathologist will look at the biopsy tissue or fluid to find out if there are cancer cells in it.

- If the fluid is clear, the lump is most likely a cyst, and not cancer.
- Bloody or cloudy fluid can mean either a cyst that’s not cancer or, very rarely, cancer.
- If the lump is solid, the doctor will pull out small pieces of tissue.

The main advantages of FNA are that the skin doesn’t have to be cut, so no stitches are needed and there is usually no scar. Also, in some cases it’s possible to make the diagnosis the same day.
An FNA biopsy is the easiest type of biopsy to have, but it can sometimes miss a cancer if the needle does not go into the cancer cells. Even if an FNA does find cancer, there may not be enough cancer cells to do some of the other lab tests that are needed.

If the results of the FNA biopsy do not give a clear diagnosis, or your doctor still has concerns, you might need to have a second biopsy or a different type of biopsy.

- **References**


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**Core Needle Biopsy of the Breast**

If other tests show you might have breast cancer, your doctor may refer you for a core needle biopsy (CNB). During this procedure, the doctor uses a wide, hollow needle to take out pieces of breast tissue from the area of concern. This can be done with the doctor feeling the area, or while using an imaging test.

**What is a core needle biopsy?**

For a CNB, the doctor uses a wide, hollow needle to take out pieces of breast tissue from a suspicious area the doctor has felt or has pinpointed on an imaging test. The needle may be attached to a spring-loaded tool that moves the needle in and out of the tissue quickly.

A small cylinder (core) of tissue is taken out in the needle. Several cores are often removed.
The doctor doing the CNB may put the needle in place by feeling the lump. But usually the needle is put into the abnormal area using some type of imaging test to guide the needle into the right place. Some of the imaging tests a doctor may use include:

- Ultrasound
- MRI
- Mammogram

What should you expect if you have a CNB?

During the CNB

A CNB is an outpatient procedure most often done in the doctor’s office with local
anesthesia (you’re awake but your breast is numbed). The procedure itself is fairly quick, though it may take more time if imaging tests are needed or if one of the special types of CNB described below is used.

You may be sitting up, lying flat or on your side, or lying face down on a special table with openings for your breasts to fit into. You will have to be still while the biopsy is done.

For any type of CNB, a thin needle will be used to put in medicine to numb your skin. Then a small cut (about ¼ inch) will be made in the breast. The needle or probe is put into the breast tissue through this cut to remove the tissue sample. You might feel pressure as the needle goes in. Again, imaging tests may be used to guide the needle to the right spot.

Typically, a tiny marker (called a clip) is put into the area where the biopsy is done. This marker shows up on mammograms or other imaging tests so the exact area can be located for further treatment or follow up. You can’t feel or see the marker. It can stay in place during MRIs, and it will not set off metal detectors.

Once the tissue is removed, the needle or probe is taken out. No stitches are needed. The area is covered with a sterile dressing. Pressure may be applied for a short time to help limit bleeding.

**After the CNB**

You may be told to limit strenuous activity for a day or so, but you should be able to go back to your usual activities after that. Your doctor or nurse will give you instructions on this.

A CNB can cause some bruising, but usually it doesn’t leave a scar. Your doctor or nurse will tell you how to care for the biopsy site and what you can and can’t do while it heals. All biopsies can cause bleeding and can lead to swelling. This can make it seem like the breast lump is larger after the biopsy. Most often, this is nothing to worry about, and the bleeding, bruising, and swelling go away over time.

**Special types of core needle biopsies**

**Stereotactic core needle biopsy**

For this procedure, a doctor uses mammogram pictures taken from different angles to
pinpoint the biopsy site. A computer analyzes the x-rays of the breast and shows exactly where the needle tip needs to go in the abnormal area. This type of CNB is often used to biopsy suspicious microcalcifications (tiny calcium deposits) or small tumors that can’t be seen clearly on an ultrasound.

**Vacuum-assisted core biopsy**

For a vacuum-assisted biopsy (VAB), a hollow probe is put through a small cut into the abnormal area of breast tissue. The doctor guides the probe into place using an imaging test. A cylinder (core) of tissue is then suctioned into the probe, and a rotating knife inside the probe cuts the tissue sample from the rest of the breast. Several samples can be taken from the same cut. This method usually removes more tissue than a core biopsy done with a regular needle.

**What does a CNB show?**

A doctor called a pathologist will look at the biopsy tissue and/or fluid to find out if there are cancer cells in it. A CNB is likely to clearly show if cancer is present, but it can still miss some cancers.

Ask your doctor when you can expect to get the results of your biopsy. If the results of the CNB do not give a clear diagnosis, or your doctor still has concerns, you might need to have a second biopsy or a different type of biopsy.

- **References**


Last Medical Review: September 1, 2017 Last Revised: October 9, 2017
Surgical Breast Biopsy

If other tests show you might have breast cancer, your doctor may refer you for a breast biopsy. Most often this will be a fine needle aspiration (FNA) biopsy or a core needle biopsy (CNB). But in some situations, such as if the results of a needle biopsy aren’t clear, you might need a surgical (open) biopsy. During this procedure, a doctor cuts out all or part of the lump so it can be checked for cancer cells.

What is a surgical biopsy?

For this type of biopsy, surgery is used to remove all or part of a lump so it can be checked to see if there are cancer cells in it.

There are 2 types of surgical biopsies:

- An incisional biopsy removes only part of the abnormal area to make a diagnosis.
- An excisional biopsy removes the entire tumor or abnormal area. An edge of normal breast tissue around the tumor may be taken, too, depending on the reason for the biopsy.

Wire localization to guide surgical biopsy

If the change in your breast can’t be felt and/or is hard to find, a mammogram, ultrasound, or MRI may be used to place a wire in the suspicious area to guide the surgeon the right spot. This is called wire localization or stereotactic wire localization.

After your breast is numbed, an imaging test is used to guide a thin, hollow needle to the abnormal area. Once the tip of the needle is in the right spot, a thin wire is put in through the center of the needle. A small hook at the end of the wire keeps it in place. The needle is then taken out. The surgeon uses the wire as a guide to the area to be removed.

What should you expect if you have a surgical biopsy?
During a surgical biopsy

Rarely, a surgical biopsy might be done in the doctor's office. But most often it's done in a hospital’s outpatient department. You are typically given local anesthesia with intravenous (IV) sedation. (This means you're awake, but your breast is numbed, and you’re given medicine to make you drowsy.) Another option is to have the biopsy done under general anesthesia (where drugs are used to put you in a deep sleep and not feel pain).

The skin of the breast is cut to allow the doctor to remove the suspicious area. You often need stitches after a surgical biopsy, and pressure may be applied for a short time to help limit bleeding. The area is then covered with a sterile dressing.

After a surgical biopsy

Your doctor or nurse will tell you how to care for the biopsy site and what you can and can’t do while it heals. All biopsies can cause bleeding and can lead to swelling. This can make it seem like the breast is larger after the biopsy. Most often, this is nothing to worry about, and the bleeding, bruising, and swelling go away over time.

A surgical biopsy may leave a scar. You might also notice a change in the shape of your breast, depending on how much tissue is removed.

What does a surgical biopsy show?

A doctor called a pathologist will look at the biopsy tissue under a microscope to find out if there are cancer cells in it.

Ask your doctor when you can expect to get the results of your biopsy. The next steps will depend on the biopsy results.

If there are no cancer cells in the tissue, your doctor will talk to you about when you need to have your next mammogram and any other follow-up visits.

If cancer is found, the doctor will talk to you about the kinds of tests needed to learn more about the cancer and how to best treat it. You might need to see other doctors, too.

• References
If you have been diagnosed with breast cancer, you might need more tests if your doctor thinks the cancer might have spread based on your symptoms, the results of your physical exam, or the size of your tumor. Your doctor will talk with you about which (if any) of these tests you will need.

**Chest x-ray**: This test may be done to see if the cancer has spread to your lungs.

**CT scan (computed tomography)**: A CT scan uses x-rays taken from different angles, which are combined by a computer to make detailed pictures of the organs. This test is most often used to look at the chest and/or belly (abdomen) to see if breast cancer has spread to other organs. It can also be used to guide a biopsy needle into an area of concern.

**MRI (magnetic resonance imaging)**: This test makes detailed pictures using radio waves and strong magnets instead of x-rays. This test can be helpful in looking at your brain and spinal cord. MRIs can be more uncomfortable than CT scans because they take longer and you often need to lie in a narrow tube while the test is done.

**Ultrasound**: For an ultrasound, a wand that gives off sound waves is moved over the skin to take pictures of the inside of the body. A gel is often put on your skin first.

**PET scan (positron emission tomography)**: For this test, a form of radioactive sugar is put into a vein and travels throughout the body. Cancer cells absorb high amounts of this sugar. A special camera then takes pictures that show the areas where the sugar collected throughout the body. A PET scan is often combined with a CT scan (known as a PET/CT scan).

**Bone scan**: This test can help show if the cancer has spread to your bones. It is similar to a PET scan, but it uses a different radioactive substance that settles in areas of change in the bones. It can show all of the bones of your body at the same time and can
find small areas of cancer spread not seen on plain x-rays.

**Finding Breast Cancer During Pregnancy**

Breast cancer during pregnancy is rare. But if you find a lump or notice any changes in your breasts that concern you, tell your doctor or nurse right away. There are a variety of tests a pregnant woman can have if breast cancer is suspected. And there are options for treating breast cancer if you are pregnant.

If you are pregnant and breast cancer is found, it may be called *gestational breast cancer* or *pregnancy-associated breast cancer* (PABC).

**How common is breast cancer during pregnancy?**

Breast cancer is found in about 1 in every 3,000 pregnant women. But it is the most common type of cancer found during pregnancy.

**Breast cancers can be harder to find when you’re pregnant**

Hormone changes during pregnancy cause the breasts to change. They may become larger, lumpy, and/or tender. This can make it harder for you or your doctor to notice a lump caused by cancer until it gets quite large.

Another reason it may be hard to find breast cancers early during pregnancy is that many women put off breast cancer screening with mammograms until after the pregnancy. And because pregnancy and breastfeeding can make breast tissue denser, it can be harder to see an early cancer on a mammogram.

Because of these challenges, when a pregnant woman develops breast cancer, it’s often diagnosed at a later stage than it would be if she were not pregnant. It’s also more likely to have spread to lymph nodes.

**What to look for**
If you find a lump or notice any changes in your breasts that concern you, don’t ignore them. Tell your doctor or nurse right away. If your doctor doesn’t want to check it out with a mammogram, ask about other kinds of imaging tests such as ultrasound or magnetic resonance imaging (MRI). You may need to get a second opinion. Any suspicious breast changes should be checked out or even biopsied (see below) before assuming they are a normal response to pregnancy.

**Are mammograms and other imaging tests safe during pregnancy?**

A main concern with any imaging test during pregnancy is whether it exposes the developing fetus to radiation, which could be harmful.

**Mammograms** can find most breast cancers that start when a woman is pregnant, and it’s thought to be safe to have a mammogram during pregnancy. The amount of radiation needed for a mammogram is small. And the radiation is focused on the breasts, so that most of it doesn’t reach other parts of the body. For extra protection, a lead shield is placed over the lower part of the belly to help keep radiation from reaching the womb. Still, scientists can’t be certain about the effects of even a very small dose of radiation on an unborn baby.

**Ultrasound** exams of the breast do not use radiation and are thought to be safe during pregnancy. This is typically an easy test to have, so it’s often the first test done to evaluate a change in the breast (such as a lump).

**MRI scans** do not use radiation and are thought to be safe during pregnancy. But the contrast material (dye) used in MRI can cross the placenta, the organ that connects the mother to the fetus. This dye has been linked with fetal abnormalities in lab animals. For this reason, many doctors do not recommend MRI with contrast dye during pregnancy. An MRI without contrast can be used if needed.

Other tests, such as **PET scans**, **bone scans**, and **computed tomography (CT) scans** are more likely to expose the fetus to radiation (see below).

**Breast biopsy during pregnancy**

A new lump or abnormal imaging test result may cause concern, but a biopsy is the only way to find out if a breast change is cancer. During a biopsy a small piece of tissue is taken from the area of concern. Breast biopsies are most often done using a needle.
They’re usually done as an outpatient procedure, even if you’re pregnant. The doctor uses medicine to numb just the area of the breast involved in the biopsy. This causes little risk to the fetus.

If a needle biopsy doesn’t give an answer, a surgical biopsy is typically the next step. This means taking out a piece of tissue through a small cut (incision) in the breast. Surgical biopsies are often done under general anesthesia (where drugs are used to put the patient into a deep sleep), which carries a small risk to the fetus.

**Tests to stage the breast cancer**

If breast cancer is found, you might need other tests to find out if cancer cells have spread within the breast or to other parts of the body. This process is called staging. Different staging tests may be needed, depending on your case.

As noted above, tests like ultrasound and MRI scans do not use radiation and are thought to be safe during pregnancy. But the contrast material (dye) sometimes used in MRI is typically not recommended during pregnancy. An MRI without contrast can be used if needed.

Chest x-rays are sometimes needed to help make treatment decisions. They use a small amount of radiation. They’re thought to be safe to have when you’re pregnant, as long as your belly is shielded.

Other tests, such as PET scans, bone scans, and computed tomography (CT) scans are more likely to expose the fetus to radiation. These tests are not often needed, especially if the cancer is thought to be just in the breast. If one of these tests is needed, doctors might be able to make adjustments to limit the amount of radiation exposure to the fetus.

Treatments are available if a pregnant woman has breast cancer. Learn about treating breast cancer during pregnancy.

**Can breast cancer spread to the baby?**

There are no reported cases of breast cancer spreading from the mother to the fetus. But in a very few cases, the cancer has reached the placenta (the organ that connects the mother to the fetus). This could affect the amount of nutrition the fetus gets from the mother.
References


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Types of Breast Cancer

There are several types of breast cancer. The type of breast cancer you have depends on where in the breast it started and other factors.

- **Types of Breast Cancer Overview**
- **Ductal Carcinoma In Situ (DCIS)**
- **Invasive Breast Cancer (IDC/ILC)**
- **Angiosarcoma of the Breast**
- **Inflammatory Breast Cancer**
- **Paget Disease of the Nipple**

Breast Cancer Grade and Other Tests

Doctors use information from your breast biopsy to learn a lot of important things about the exact kind of breast cancer you have.

- **Breast Cancer Grades**
- **Breast Cancer: Ploidy and Cell Proliferation**
- **Breast Cancer Hormone Receptor Status**
- **Breast Cancer HER2 Status**
- **Breast Cancer Gene Expression Tests**
- **Understanding Your Pathology Report**

Stages and Outlook (Prognosis)

If you have been diagnosed with breast cancer, tests will be done to find out the extent (stage) of the cancer. The stage of a cancer helps determine how serious the cancer is
and how best to treat it.

- Breast Cancer Stages
- Breast Cancer Survival Rates

Questions to Ask About Your Breast Cancer

You can take an active role in your breast cancer care by learning about your cancer and its treatment and by asking questions. Get a list of key questions here.

- Questions to Ask Your Doctor About Breast Cancer
- Questions Worksheet [PDF]

Types of Breast Cancer

There are many types of breast cancer. The most common types are ductal carcinoma in situ, invasive ductal carcinoma, and invasive lobular carcinoma.

The type of breast cancer is determined by the specific cells in the breast that are affected. Most breast cancers are carcinomas. Carcinomas are tumors that start in the epithelial cells that line organs and tissues throughout the body. Sometimes, an even more specific term is used. For example, most breast cancers are a type of carcinoma called adenocarcinoma, which starts in cells that make up glands (glandular tissue). Breast adenocarcinomas start in the ducts (the milk ducts) or the lobules (milk-producing glands).

There are other, less common, types of breast cancers, too, such as sarcomas, phyllodes, Paget disease, and angiosarcomas which start in the cells of the muscle, fat, or connective tissue.

Sometimes a single breast tumor can be a combination of different types. And in some very rare types of breast cancer, the cancer cells may not form a lump or tumor at all.

When a biopsy is done to find out the specific type of breast cancer, the pathologist will also check if the cancer has spread into the surrounding tissues. The following terms are used to describe the extent of the cancer:

- **In situ** breast cancers have not spread.
- **Invasive** or **infiltrating** cancers have spread (invaded) into the surrounding breast tissue.
Common kinds of breast cancer

The most common kinds of breast cancer are carcinomas, and are named based on where they form and how far they have spread.

These general kinds of breast cancer below can be further described with the terms outlined above.

In situ cancers

Ductal carcinoma in situ (DCIS; also known as intraductal carcinoma) is a non-invasive or pre-invasive breast cancer. See Ductal Carcinoma in Situ (DCIS) for more information.

Lobular carcinoma in situ (LCIS) may also be called lobular neoplasia. This breast change is not a cancer, though the name can be confusing. In LCIS, cells that look like cancer cells are growing in the lobules of the milk-producing glands of the breast, but they don’t grow through the wall of the lobules. See Lobular Carcinoma in Situ (LCIS) for more information.

Invasive (infiltrating) breast cancer

Breast cancers that have spread into surrounding breast tissue are known as invasive breast cancer. There are many different kinds of invasive breast cancer, but the most common are called invasive ductal carcinoma and invasive lobular carcinoma. See Invasive Breast Cancer for more information.

Less common types of breast cancer

Inflammatory breast cancer

Inflammatory breast cancer is an uncommon type of invasive breast cancer. It accounts for about 1% to 5% of all breast cancers.

Paget disease of the nipple

Paget disease of the nipple starts in the breast ducts and spreads to the skin of the nipple and then to the areola (the dark circle around the nipple). It is rare, accounting for
only about 1-3% of all cases of breast cancer.

**Phyllodes tumor**

Phyllodes tumors are rare breast tumors. They develop in the connective tissue (stroma) of the breast, in contrast to carcinomas, which develop in the ducts or lobules. Most are benign, but there are others that are malignant (cancer). See Phyllodes Tumors of the Breast for more information.

**Angiosarcoma**

Sarcomas of the breast are rare making up less than 1% of all breast cancers. Angiosarcoma starts in cells that line blood vessels or lymph vessels. It can involve the breast tissue or the skin of the breast. Some may be related to prior radiation therapy in that area.

- **References**


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Ductal Carcinoma In Situ (DCIS)

About 1 in 5 new breast cancers will be DCIS or ductal carcinoma in situ. Nearly all women with this early stage of breast cancer can be cured.

Ductal carcinoma in situ (DCIS), is also called intraductal carcinoma and Stage 0 breast cancer. DCIS is a non-invasive or pre-invasive breast cancer. This means the cells that line the ducts have changed to cancer cells but they have not spread through the walls of the ducts into the nearby breast tissue.

Because DCIS hasn’t spread into the breast tissue around it, it can’t spread (metastasize) beyond the breast to other parts of the body.

DCIS is considered a pre-cancer because sometimes it can become an invasive cancer. This means that over time, DCIS may spread out of the duct into nearby tissue, and could metastasize (spread). Right now, though, there’s no good way to know for sure which will become invasive cancer and which ones won’t. So almost all women with DCIS will be treated.
Learn about treatment for ductal carcinoma in situ.

Invasive Breast Cancer (IDC/ILC)

Breast cancers that have spread into surrounding breast tissue are known as invasive breast cancer. There are different kinds of invasive breast cancer. Some kinds are more common than others.
Invasive (infiltrating) ductal carcinoma (IDC)

This is the most common type of breast cancer. About 8 of 10 invasive breast cancers are invasive (or infiltrating) ductal carcinomas (IDC).

IDC starts in the cells that line a milk duct in the breast, breaks through the wall of the duct, and grows into the nearby breast tissues. At this point, it may be able to spread (metastasize) to other parts of the body through the lymph system and bloodstream.

Invasive lobular carcinoma (ILC)

Invasive lobular carcinoma (ILC) starts in the milk-producing glands (lobules). Like IDC, it can spread (metastasize) to other parts of the body. About 1 in 10 invasive breast cancers is an ILC. Invasive lobular carcinoma may be harder to detect on physical exam as well as imaging, like mammograms, than invasive ductal carcinoma. And compared to other kinds of invasive carcinoma, about 1 in 5 women with ILC might have cancer in both breasts.

Special types of invasive breast cancer

There are some special types of breast cancer that are sub-types of invasive carcinoma. They are much less common than the breast cancers listed named above and each typically make up fewer than 5% of all breast cancers. These are often named after features seen when they are viewed under the microscope, like the ways the cells are arranged.

Some of these may have a better prognosis than standard invasive infiltrating ductal carcinoma. These include:

- Adenoid cystic (or adenocystic) carcinoma
- Low-grade adenosquamous carcinoma (this is a type of metaplastic carcinoma)
- Medullary carcinoma
- Mucinous (or colloid) carcinoma
- Papillary carcinoma
- Tubular carcinoma

Some sub-types have the same or maybe worse prognoses than standard invasive infiltrating ductal carcinoma. These include:
• Metaplastic carcinoma (most types, including spindle cell and squamous, except low grade adenosquamous carcinoma)
• Micropapillary carcinoma
• Mixed carcinoma (has features of both invasive ductal and lobular)

In general, all of these sub-types are still treated like standard invasive infiltrating ductal carcinoma.

Learn about treatments for invasive breast cancer.

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Inflammatory Breast Cancer

Inflammatory breast cancer (IBC) is rare. It differs from other types of breast cancer in its symptoms, outlook, and treatment. Symptoms include breast swelling, purple or red color of the skin, and pitting or thickening of the skin of the breast so that it may look and feel like an orange peel. Often, a lump is not felt. If you have any of these symptoms, it does not mean that you have IBC, but you should see a doctor right away.

What is inflammatory breast cancer?

Inflammatory breast cancer (IBC) has some symptoms of inflammation like swelling and redness. But infection or injury do not cause IBC or the symptoms. IBC symptoms are caused by cancer cells blocking lymph vessels in the skin.

How is inflammatory breast cancer different from other types of breast cancer?

Inflammatory breast cancer differs (IBC) from other types of breast cancer in several key ways:

• IBC doesn’t look like a typical breast cancer. It often does not cause a breast lump, and it might not show up on a mammogram. This makes it harder to diagnose.
• IBC tends to occur in younger women (at an average age of 52 versus 57 for more
common forms of breast cancer).

- African-American women appear to be at higher risk of IBC than white women.
- IBC is more common among women who are overweight or obese.
- IBC also tends to be more aggressive—it grows and spreads much more quickly—than more common types of breast cancer.
- IBC is always at a locally advanced stage when it’s first diagnosed because the breast cancer cells have grown into the skin. (This means it at least stage IIIB.)
- In about 1 of every 3 cases, IBC has already spread (metastasized) to distant parts of the body when it is diagnosed. This makes it harder to treat successfully.

What are the signs and symptoms of inflammatory breast cancer?

Inflammatory breast cancer (IBC) causes a number of signs and symptoms, most of which develop quickly (within 3-6 months), including:

- Thickening (edema/swelling) of the skin of the breast
- Redness involving more than one-third of the breast
- Pitting or thickening of the skin of the breast so that it may look and feel like an orange peel
- A retracted or inverted nipple
- One breast looking larger than the other because of swelling
- One breast feeling warmer and heavier than the other
- A breast that may also be tender, painful or itchy
Tenderness, redness, warmth, and itching are also common symptoms of a breast infection or inflammation, such as mastitis if you’re pregnant or breastfeeding. Because these problems are much more common than IBC, your doctor might at first suspect infection as a cause and treat you with antibiotics.

This may be a good first step, but if your symptoms don’t get better in 7 to 10 days, more tests need to be done to look for cancer. The possibility of IBC should be considered more strongly if you have these symptoms and are not pregnant or breastfeeding, or have been through menopause.

IBC grows and spreads quickly, so the cancer may have already spread to nearby lymph nodes by the time symptoms are noticed. This spread can cause swollen lymph nodes under your arm or above your collar bone. If the diagnosis is delayed, the cancer can spread to lymph nodes in your chest or to distant sites.

If you have any of these symptoms, it does not mean that you have IBC, but you should
see a doctor right away. If treatment with antibiotics is started, you’ll need to let your doctor know if it doesn’t help, especially if the symptoms get worse or the affected area gets larger. Ask to see a specialist (like a breast surgeon) or you might want to get a second opinion if you’re concerned.

How is inflammatory breast cancer diagnosed?

Imaging tests

If inflammatory breast cancer (IBC) is suspected, one or more of the following imaging tests may be done:

- Mammogram
- Breast ultrasound
- MRI (magnetic resonance imaging) scan
- CT (computed tomography) scan
- PET (positron emission tomography) scan

Sometimes a photo of the breast is taken to help record the amount of redness and swelling before starting treatment.

Biopsy

Breast cancer is diagnosed by a biopsy, taking out a small piece of the breast tissue and looking at it in the lab. Your physical exam and other tests may show findings that are “suspicious for” IBC, but only a biopsy can tell for sure that it is cancer.

Tests on biopsy samples

The cancer cells in the biopsy sample will be graded based on how abnormal they look. They will also be tested for certain proteins that help decide which treatments will be helpful.

The cells are tested for hormone receptors. Women whose breast cancer cells contain hormone receptors are likely to benefit from treatment with hormone therapy drugs.

Cancer cells are also tested to see if they contain too much of a protein called HER2/neu (often just called HER2) or too many copies of the gene for that protein. If they do, the woman may be helped by certain drugs that target HER2.
Stages of inflammatory breast cancer

All Inflammatory breast cancers start as **Stage IIIB** since they involve the skin. If the cancer has spread to lymph nodes around the collarbone or inside the chest, it's **stage IIIC**. Cancer that has spread outside the breast and nearby lymph nodes is **stage IV**.

For more information, read about breast cancer staging.

Survival rates for inflammatory breast cancer

Inflammatory breast cancer (IBC) is considered an aggressive cancer because it grows quickly, is more likely to have spread at the time it's found, and is more likely to come back after treatment than other types of breast cancer. The outlook is generally not as good as it is for other types of breast cancer.

Survival rates are often based on previous outcomes of large numbers of people who had the disease, but they cannot predict what will happen in any particular person's case. Many other factors can affect a person's outlook, such as age, general health, treatment received, and how well the cancer responds to treatment. Your doctor can tell you how the numbers below may apply to you, as he or she is familiar with your situation.

These survival rates are based on people diagnosed years ago. Improvements in treatment since then may result in a more favorable outlook for people now being diagnosed with inflammatory breast cancer.

These numbers are based on data from the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) database, for patients who were diagnosed with inflammatory breast cancer between 1990 and 2008.

Median survival is the length of time for half of the patients in a group to have died. By definition, half of the patients in that group are still alive. It is important to remember that the median is just a kind of average used by researchers. No one is "average" and many people have much better outcomes than the median. Also, people with inflammatory breast cancer can die of other things, and these numbers don't take that into account.

- The median survival rate for people with stage III inflammatory breast cancer is about 57 months.
- The median survival rate for people with stage IV inflammatory breast cancer is
about 21 months.

**How is inflammatory breast cancer treated?**

Inflammatory breast cancer (IBC) that has not spread outside the breast or nearby lymph nodes is stage IIIB or IIIC. In most cases, treatment is chemotherapy to try to shrink the tumor, followed by surgery to remove the cancer. Radiation is given after surgery, and, in some cases, more treatment may be given after radiation.

IBC that has spread to other parts of the body (stage IV) may be treated with chemotherapy, hormone therapy, and/or with drugs that targets HER2.

For details, see [treatment of inflammatory breast cancer](#).

- **References**


Angiosarcoma of the Breast

What is angiosarcoma of the breast?

Angiosarcoma is rare cancer that starts in the cells that line blood vessels or lymph vessels. It's sometimes a complication of previous radiation treatment to the breast. It can also occur in the affected arms of women with lymphedema, but this is not common. (Lymphedema is swelling that can develop after surgery or radiation therapy to treat breast cancer.) It can cause skin changes and/or a lump in the breast.

How is angiosarcoma treated?

Angiosarcomas tend to grow and spread quickly. Treatment usually includes surgery to remove the breast (mastectomy), and is generally the same as for other sarcomas.
Paget Disease of the Nipple

Paget disease of the nipple is a rare type of breast cancer involving the skin of the nipple. Paget disease starts in the breast ducts and spreads to the skin of the nipple and then to the areola, the dark circle around the nipple. Paget disease usually affects only one nipple. It’s usually linked to either ductal carcinoma in situ (DCIS) or infiltrating ductal carcinoma.

Paget disease can look very similar to eczema (very dry skin) of the nipple. Your physician may try to treat this as eczema first, and if it does not improve, recommend a biopsy.

What are the signs and symptoms of Paget disease of the nipple?

The skin of the nipple and areola often looks crusted, scaly, and red. There may be blood or yellow fluid coming out of the nipple. Sometimes the nipple looks flat or inverted. It also might burn or itch.

How is Paget disease of the nipple diagnosed?

Most people with Paget disease of the nipple also have tumors in the same breast. One or more of the following imaging tests may be done to check for other breast changes:

- Diagnostic mammogram
- Breast ultrasound
- MRI (magnetic resonance imaging) scan

Paget disease of the nipple is diagnosed by a biopsy, removing a small piece of the breast tissue and looking at it in the lab. In some cases, the entire nipple may be removed. Only a biopsy can tell for sure that it is cancer.
How is Paget disease of the nipple treated?

Paget disease can be treated by removing the entire breast (mastectomy) or breast-conserving surgery followed by whole-breast radiation therapy.

If no lump is felt in the breast tissue, and your biopsy results show the cancer has not spread, the outlook (prognosis) is excellent.

If the cancer has spread (is invasive), the outlook is not as good, and the cancer will be staged and treated like any other invasive ductal carcinoma.

Breast Cancer Hormone Receptor Status

Breast cancer cells taken out during a biopsy or surgery will be tested to see if they have certain proteins that are estrogen or progesterone receptors. When the hormones estrogen and progesterone attach to these receptors, they fuel the cancer growth. Cancers are called hormone receptor-positive or hormone receptor-negative based on whether or not they have these receptors (proteins). Knowing the hormone receptor status is important in deciding treatment options.

What are estrogen and progesterone receptors?

Receptors are proteins in or on cells that can attach to certain substances in the blood. Normal breast cells and some breast cancer cells have receptors that attach to the hormones estrogen and progesterone, and depend on these hormones to grow.

Breast cancer cells may have one, both, or none of these receptors.

- **ER-positive**: Breast cancers that have estrogen receptors are called *ER-positive* (or ER+) cancers.
- **PR-positive**: Breast cancers with progesterone receptors are called *PR-positive* (or PR+) cancers.

Keeping these receptors from attaching to the hormones can help keep the cancer from growing and spreading. There are drugs that can be used to do this.
**Why is knowing hormone receptor status important?**

Knowing the hormone receptor status of your cancer helps doctors decide how to treat it. If your cancer has one or both of these hormone receptors, hormone therapy drugs can be used to either lower estrogen levels or stop estrogen from acting on breast cancer cells. This kind of treatment is helpful for hormone receptor-positive breast cancers, but it doesn’t work on tumors that are hormone receptor-negative (both ER- and PR-negative).

All invasive breast cancers should be tested for both of these hormone receptors either on the biopsy sample or when the tumor is removed with surgery. About 2 of 3 breast cancers have at least one of these receptors. This percentage is higher in older women than in younger women. DCIS should be checked for hormone receptors, too.

**What do the hormone receptor test results mean?**

A test called an immunohistochemistry or IHC is used most often to find out if cancer cells have estrogen and progesterone receptors. The test results will help guide you and your cancer care team in making the best treatment decisions.

Test results will give you your hormone receptor status. It will say a tumor is hormone receptor-positive if at least 1% of the cells tested have estrogen and/or progesterone receptors. Otherwise the test will say the tumor is hormone receptor-negative.

**Hormone receptor-positive** (or hormone-positive) breast cancer cells have either estrogen (ER) or progesterone (PR) receptors. These breast cancers can be treated with hormone therapy drugs that lower estrogen levels or block estrogen receptors. This includes cancers that are ER-negative but PR-positive. Hormone receptor-positive cancers tend to grow more slowly than those that are hormone receptor-negative. Women with hormone receptor-positive cancers tend to have a better outlook in the short-term, but these cancers can sometimes come back many years after treatment.

**Hormone receptor-negative** (or hormone-negative) breast cancers have neither estrogen nor progesterone receptors. Treatment with hormone therapy drugs is not helpful for these cancers. These cancers tend to grow faster than hormone receptor-positive cancers. If they come back after treatment, it’s often in the first few years. Hormone receptor-negative cancers are more common in women who have not yet gone through menopause.
**Triple-negative** breast cancer cells don’t have estrogen or progesterone receptors and also don’t make too much of the protein called **HER2**. These cancers tend to be more common in younger women and in women who are African-American or Hispanic/Latina. Triple-negative breast cancers grow and spread faster than most other types of breast cancer. Because the cancer cells don’t have hormone receptors, hormone therapy is not helpful in treating these cancers. And because they don’t have too much HER2, drugs that target HER2 aren’t helpful, either. Chemotherapy can still be useful.

**Triple-positive** cancers are ER-positive, PR-positive, and HER2-positive. These cancers can be treated with hormone drugs as well as drugs that target HER2.

- **References**


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Breast Cancer HER2 Status

Some women have breast tumors with higher levels of a protein known as HER2/neu – these are called HER2-positive breast cancers.

What is HER2/neu and what does it mean?

HER2/neu (often just shortened to HER2) is a growth-promoting protein on the outside of all breast cells. Breast cancer cells with higher than normal levels of HER2 are called HER2-positive. These cancers tend to grow and spread faster than other breast cancers. Women newly diagnosed with invasive breast cancers should be tested for HER2. It’s important to know your “HER2 status” because HER2-positive cancers are much more likely to benefit from treatment with drugs that target the HER2 protein. Ask your doctor about your HER2 status and what it means for you.

How are breast tumors tested for HER2?

A biopsy or surgery sample of the cancer is usually tested with either immunohistochemical stains (IHC) or Fluorescent in situ hybridization (FISH).

See Testing Biopsy and Cytology Specimens for cancer and Understanding Your Pathology Report: Breast Cancer to get more details about these tests.

What do the test results mean?

The results of HER2 testing will guide you and your cancer care team in making the best treatment decisions.

Many breast cancer specialists think that the FISH test is more accurate than IHC. However, it is more expensive and takes longer to get the results. Often the IHC test is done first.

- If the result is 0 or 1+, the cancer is considered HER2-negative. They do not respond to treatment with drugs that target HER2.
- If the result is 3+, the cancer is HER2-positive. They are usually treated with drugs that target HER2.
• If the result is 2+, the HER2 status of the tumor is not clear and is called "equivocal." This means that the HER2 status needs to be tested with FISH to clarify the result.

**Triple-negative** breast tumors don't have too much HER2 and also don't have estrogen or progesterone receptors. They are HER2-, ER-, and PR-negative. These cancers are more common in younger women and in African-American or Hispanic/Latina women. Triple-negative breast cancers grow and spread more quickly than most other types of breast cancer. Because the cancer cells don't have hormone receptors, hormone therapy is not helpful in treating these cancers. Because they don't have too much HER2, drugs that target HER2 aren't helpful, either. **Chemotherapy** can still be useful, though.

**Triple-positive** breast tumors are HER2-, ER-, and PR-positive. These cancers are treated with hormone drugs as well as drugs that target HER2.

**References**


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Breast Cancer Gene Expression Tests

Tests that look at the patterns of certain genes (sometimes called *gene expression profiling*) can help predict if some early-stage (stage 1 or 2) breast cancers are likely to come back after initial treatment. Doctors can use this information to know which women will most likely benefit from chemotherapy after breast surgery.

What are gene expression tests?

Looking at the patterns of a number of different genes at the same time can help predict if certain stage 1 or 2 breast cancers are likely to come back after initial treatment. Tests like these are part of what’s being called “personalized medicine” – learning more about your cancer to specially tailor your treatment.

The **Oncotype DX®** and the **MammaPrint®** are examples of tests that look at different sets of breast cancer genes. And there are more tests in development.

How are the tests done?

**Oncotype DX®**: The Oncotype DX test is used for small hormone receptor-positive tumors that have not spread to more than 3 lymph nodes, but it may be used for more advanced tumors, too. It can also be used for DCIS (ductal carcinoma in situ or stage 0 breast cancer).

This test looks at a set of 21 genes in cancer cells from tumor biopsy samples to get a “recurrence score,” which is a number between 0 and 100. The score reflects the risk of the breast cancer coming back (recurring) in the next 10 years and how likely you will benefit from getting chemotherapy.

- **A lower score means a low risk of recurrence**. Women with low-recurrence scores would probably not benefit from chemotherapy.
- **An intermediate score means an intermediate risk of recurrence**. Women with intermediate-recurrence scores may have a small benefit from chemotherapy and should discuss the options, risks and benefits of chemotherapy with their doctor. Research is being done to see who in the intermediate group will benefit from chemotherapy.
- **A high score means a high risk of recurrence**. Women with high-recurrence
scores are likely to benefit from chemotherapy to help decrease the chance of the cancer coming back.

**MammaPrint®**: This test can be used to help determine how likely breast cancers are to recur in a distant part of the body after treatment. It can be used in any type of breast cancer that’s small (stage 1 or 2) and has spread to no more than 3 lymph nodes. **Hormone** and **HER2 status** are assessed as part of this test.

The test looks at 70 different genes to determine if the cancer is at low risk or high risk of coming back (recurring) in the next 10 years. The test results come back as either “low risk” or “high risk.”

**What do the test results mean?**

Gene expression testing (gene profiling) can help predict which women will most likely benefit from chemotherapy after breast surgery. (This is called adjuvant chemotherapy.) **Hormone therapy** is a standard treatment for hormone receptor-positive breast cancers, but it’s not always clear when to use chemotherapy. These tests can help guide that decision.

Still, these tests cannot tell any one woman for certain if her cancer will come back with or without chemotherapy. Many doctors use these tests (along with other information) to help make decisions about offering chemotherapy. Keep in mind that these tests aren’t needed in all cases. For instance, if you have a fast-growing or a stage 4 breast cancer, you don’t need these tests because you should get chemotherapy as part of standard treatment.

These tests are now being looked at in large **clinical trials** to better understand how and when to best use them. In the meantime, women might want to ask their doctors if these tests might be useful for them.

- **References**


Breast Cancer: Ploidy and Cell Proliferation

Finding out more information about the DNA in the breast cancer cells can help predict how fast the cancer cells are dividing and growing.

What is ploidy and what does it mean?

The ploidy of cancer cells refers to the amount of DNA they contain.

- If there’s a normal amount of DNA in the cells, they are said to be diploid. These cancers tend to grow and spread more slowly.
- If the amount of DNA is abnormal, then the cells are called aneuploid. These cancers tend to be more aggressive. (They tend to grow and spread faster.)

Tests of ploidy may help figure out long-term outcomes, but they rarely change treatment and are considered optional. They are not usually recommended as part of a routine breast cancer work-up.

What is cell proliferation?

Cell proliferation is how quickly a cancer cell copies its DNA and divides into 2 cells. If the cancer cells are dividing more rapidly, it means the cancer is faster growing or more aggressive.

The rate of cancer cell division can be estimated by doing a Ki-67 test. The S-phase fraction is the percentage of cells in a sample that are copying their DNA. DNA is copied when the cell is getting ready to divide into 2 new cells. If the S-phase fraction or Ki-67 labeling index is high, it means that the cancer cells are dividing more rapidly.
In some cases, Ki-67 testing to measure cell proliferation may be used to help plan treatment or estimate treatment outcomes. But test results vary depending on things like the lab doing the testing, the testing method, and what part of the tumor is tested. Still, there’s a lot of interest in measuring tumor proliferation and standardizing testing methods, so this test is being used more often.

**References**

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**Breast Cancer Grades**

Knowing a breast cancer’s grade is important to figure out how fast it’s likely to grow and spread.

**What is a breast cancer’s grade?**

Cancer cells are given a grade when they are removed from the breast and checked under a microscope. The grade is based on how much the cancer cells look like normal cells.

A lower grade number (1) usually means the cancer is slower-growing and less likely to spread.

A higher number (3) means a faster-growing cancer that’s more likely to spread. The grade is used to help predict your outcome (prognosis) and help figure out what treatments might work best.

Three features are examined and each is assigned a score to determine the histologic grade. The scores are then added. This sum (between 3 and 9) is used to get a grade of 1, 2, or 3, which is noted on your pathology report. Sometimes words such as well differentiated, moderately differentiated, and poorly differentiated are used to describe the grade instead of numbers:
• **Grade 1 or well differentiated** (score 3, 4, or 5). The cells are slower-growing, and look more like normal breast tissue.
• **Grade 2 or moderately differentiated** (score 6, 7). The cells are growing at a speed of and look like cells somewhere between grades 1 and 3.
• **Grade 3 or poorly differentiated** (score 8, 9). The cancer cells look very different from normal cells and will probably grow and spread faster.

Our information about pathology reports can help you understand details about your breast cancer.

### Grading ductal carcinoma in situ (DCIS)

DCIS is graded only on how abnormal the cancer cells look. **Necrosis** (areas of dead or dying cancer cells) is also noted. If there is necrosis, it means the tumor is growing quickly.

The term **comedocarcinoma** is often used to describe DCIS with a lot of necrosis. If a breast duct is filled with a plug of dead and dying cells, the term **comedonecrosis** may be used. Comedocarcinoma and comedonecrosis are linked to a higher grade of DCIS.

See [Understanding Your Pathology Report: Ductal Carcinoma In Situ](#) for more on how DCIS is described.

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### Breast Cancer Stages

After someone is diagnosed with breast cancer, doctors will try to figure out if it has spread, and if so, how far. This process is called **staging**. The stage of a cancer describes how much cancer is in the body. It helps determine how serious the cancer is and how best to **treat** it. Doctors also use a cancer's stage when talking about survival statistics.

The earliest stage breast cancers are stage 0 (carcinoma in situ). It then ranges from stage I (1) through IV (4). As a rule, the lower the number, the less the cancer has spread. A higher number, such as stage IV, means cancer has spread more. And within a stage, an earlier letter means a lower stage.
How is the stage determined?

The staging system most often used for breast cancer is the American Joint Committee on Cancer (AJCC) TNM system, which is based on 7 key pieces of information:

- The extent (size) of the tumor (T): How large is the cancer? Has it grown into nearby areas?
- The spread to nearby lymph nodes (N): Has the cancer spread to nearby lymph nodes? If so, how many?
- The spread (metastasis) to distant sites (M): Has the cancer spread to distant organs such as the lungs or liver?
- Estrogen Receptor (ER) status: Does the cancer have the protein called an estrogen receptor?
- Progesterone Receptor (PR) status: Does the cancer have the protein called a progesterone receptor?
- Her2/neu (Her2) status: Does the cancer make too much of a protein called Her2?
- Grade of the cancer (G): How much do the cancer cells look like normal cells?

Oncotype Dx® Recurrence Score results may also be considered in the stage in certain circumstances.

The most recent AJCC system, effective January 2018, has both clinical and pathologic staging systems for breast cancer. The pathologic stage (also called the surgical stage) is determined by examining tissue removed during an operation. Sometimes, if surgery is not possible right away or at all, the cancer will be given a clinical stage instead. This is based on the results of a physical exam, biopsy, and imaging tests. The clinical stage is used to help plan treatment. Sometimes, though, the cancer has spread further than the clinical stage estimates, and may not predict the patient's outlook as accurately as a pathologic stage.

Numbers or letters after T, N, and M provide more details about each of these factors. Higher numbers mean the cancer is more advanced. Once a person’s T, N, and M categories, as well as ER, PR, Her2 status and grade of the cancer have been determined, this information is combined in a process called stage grouping to assign an overall stage. For more information see Cancer Staging. Detailed explanations of the TNM categories are seen below. The addition of information about ER, PR, and Her2 status along with grade has made stage grouping complex, so, it is best to ask your doctor about your specific stage and what it means.

Details of the TNM staging system
T categories for breast cancer

T followed by a number from 0 to 4 describes the main (primary) tumor’s size and if it has spread to the skin or to the chest wall under the breast. Higher T numbers mean a larger tumor and/or wider spread to tissues near the breast.

TX: Primary tumor cannot be assessed.

T0: No evidence of primary tumor.

Tis: Carcinoma in situ (DCIS, or Paget disease of the nipple with no associated tumor mass)

T1 (includes T1a, T1b, and T1c): Tumor is 2 cm (3/4 of an inch) or less across.

T2: Tumor is more than 2 cm but not more than 5 cm (2 inches) across.

T3: Tumor is more than 5 cm across.

T4 (includes T4a, T4b, T4c, and T4d): Tumor of any size growing into the chest wall or skin. This includes inflammatory breast cancer.

N categories for breast cancer

N followed by a number from 0 to 3 indicates whether the cancer has spread to lymph nodes near the breast and, if so, how many lymph nodes are involved.

Lymph node staging for breast cancer is based on how the nodes look under the microscope, and has changed as technology has improved. Newer methods have made it possible to find smaller and smaller collections of cancer cells, but experts haven’t been sure how much these tiny deposits of cancer cells affect outlook.

It’s not yet clear how much cancer in the lymph node is needed to see a change in outlook or treatment. This is still being studied, but for now, a deposit of cancer cells must contain at least 200 cells or be at least 0.2 mm across (less than 1/100 of an inch) for it to change the N stage. An area of cancer spread that is smaller than 0.2 mm (or fewer than 200 cells) doesn’t change the stage, but is recorded with abbreviations (i+ or mol+) that indicate the type of special test used to find the spread.

If the area of cancer spread is at least 0.2 mm (or 200 cells), but still not larger than 2 mm, it is called a micrometastasis (one mm is about the size of the width of a grain of
Micrometastases are counted only if there aren't any larger areas of cancer spread. Areas of cancer spread larger than 2 mm are known to affect outlook and do change the N stage. These larger areas are sometimes called **macrometastases**, but are more often just called metastases.

**NX:** Nearby lymph nodes cannot be assessed (for example, if they were removed previously).

**N0:** Cancer has not spread to nearby lymph nodes.

- **N0(i+):** The area of cancer spread contains less than 200 cells and is smaller than 0.2 mm. The abbreviation "i+" means that a small number of cancer cells (called isolated tumor cells) were seen in routine stains or when a special type of staining technique, called immunohistochemistry, was used.

- **N0(mol+):** Cancer cells cannot be seen in underarm lymph nodes (even using special stains), but traces of cancer cells were detected using a technique called **RT-PCR**. RT-PCR is a molecular test that can find very small numbers of cancer cells. (This test is not often used to find breast cancer cells in lymph nodes because the results do not influence treatment decisions.)

**N1:** Cancer has spread to 1 to 3 axillary (underarm) lymph node(s), and/or tiny amounts of cancer are found in internal mammary lymph nodes (those near the breast bone) on sentinel lymph node biopsy.

- **N1mi:** Micrometastases (tiny areas of cancer spread) in the lymph nodes under the arm. The areas of cancer spread in the lymph nodes are at least 0.2 mm across, but not larger than 2 mm.

- **N1a:** Cancer has spread to 1 to 3 lymph nodes under the arm with at least one area of cancer spread greater than 2 mm across.

- **N1b:** Cancer has spread to internal mammary lymph nodes on the same side as the cancer, but this spread could only be found on sentinel lymph node biopsy (it did not cause the lymph nodes to become enlarged).

- **N1c:** Both N1a and N1b apply.

**N2:** Cancer has spread to 4 to 9 lymph nodes under the arm, or cancer has enlarged the internal mammary lymph nodes

- **N2a:** Cancer has spread to 4 to 9 lymph nodes under the arm, with at least one
area of cancer spread larger than 2 mm.

**N2b:** Cancer has spread to one or more internal mammary lymph nodes, causing them to become enlarged.

**N3:** Any of the following:

**N3a:** either:

Cancer has spread to 10 or more axillary lymph nodes, with at least one area of cancer spread greater than 2 mm,

OR

Cancer has spread to the lymph nodes under the collarbone (infraclavicular nodes), with at least one area of cancer spread greater than 2 mm.

**N3b:** either:

Cancer is found in at least one axillary lymph node (with at least one area of cancer spread greater than 2 mm) and has enlarged the internal mammary lymph nodes,

OR

Cancer has spread to 4 or more axillary lymph nodes (with at least one area of cancer spread greater than 2 mm), and tiny amounts of cancer are found in internal mammary lymph nodes on sentinel lymph node biopsy.

**N3c:** Cancer has spread to the lymph nodes above the collarbone (supraclavicular nodes) with at least one area of cancer spread greater than 2 mm.

**M categories for breast cancer**

M followed by a 0 or 1 indicates whether the cancer has spread to distant organs -- for example, the lungs, liver, or bones.

**MX:** Distant spread (metastasis) cannot be assessed.

**M0:** No distant spread is found on x-rays (or other imaging tests) or by physical exam.
cM0(i+): Small numbers of cancer cells are found in blood or bone marrow (found only by special tests), or tiny areas of cancer spread (no larger than 0.2 mm) are found in lymph nodes away from the underarm, collarbone, or internal mammary areas.

M1: Cancer has spread to distant organs (most often to the bones, lungs, brain, or liver).

**Examples using the new staging system**

**Example #1**

If the cancer size is between 2 and 5 cm (T2) but it has not spread to the nearby lymph nodes (N0) or to distant organs (M0) AND is:

- Grade 3
- Her2 negative
- ER positive
- PR positive

The cancer stage is IB.

**Example #2**

If the cancer is larger than 5 cm (T3) and has spread to 4 to 9 lymph nodes under the arm or to any internal mammary lymph nodes (N2) but not to distant organs (M0) AND is:

- Grade 2
- Her2 positive
- ER positive
- PR positive

The cancer stage is IB.

**Example #3**

If the cancer is larger than 5 cm (T3) and has spread to 4 to 9 lymph nodes under the arm or to any internal mammary lymph nodes (N2) but not to distant organs (M0) AND is:
• Grade 2
• Her2 negative
• ER negative
• PR negative

The cancer stage is IIIB.

• References


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**Breast Cancer Survival Rates**

Survival rates tell you what portion of people with the same type and stage of cancer are still alive a certain amount of time (usually 5 years) after they were diagnosed. They can’t tell you how long you will live, but they may help give you a better understanding about how likely it is that your [treatment](#) will be successful. Some people will want to know the survival rates for their cancer type and stage, and some people won’t. If you don’t want to know, you don’t have to.

**What is a 5-year survival rate?**

Statistics on the outlook for a certain type and stage of cancer are often given as 5-year
survival rates, but many people live longer – often much longer – than 5 years. The **5-year survival rate is the percentage of people who live at least 5 years after being diagnosed with cancer**. For example, a 5-year survival rate of 90% means that an estimated 90 out of 100 people who have that cancer are still alive 5 years after being diagnosed.

Relative survival rates are a more accurate way to estimate the effect of cancer on survival. These rates compare women with breast cancer to women in the overall population. For example, if the 5-year relative survival rate for a specific type of cancer is 90%, it means that people who have that cancer are, on average, about 90% as likely as people who don’t have that cancer to live for at least 5 years after being diagnosed.

But remember, the 5-year relative survival rates are estimates – your outlook can vary based on a number of your specific factors.

**Cancer survival rates don’t tell the whole story**

Survival rates are often based on previous outcomes of large numbers of people who had the disease, but they can’t predict what will happen in any particular person’s case. There are a number of limitations to remember:

- The numbers below are among the most current available. But to get 5-year survival rates, doctors have to look at people who were treated at least 5 years ago. As treatments are improving over time, women who are now being diagnosed with breast cancer may have a better outlook than these statistics show.
- The available statistics for breast cancer do not divide survival rates by all of the sub stages, such as IA and IB. The rates for these substages are likely to be close to the rate for the overall stage. For example, the survival rate for stage IA is likely to be slightly higher than that listed for stage I, while the survival rate for stage IB would be expected to be slightly lower.
- These statistics are based on the stage of the cancer when it was first diagnosed. They do not apply to cancers that come back later or spread, for example.
- Many other factors can affect a person’s outlook, such as age and health, the presence of hormone receptors on the cancer cells, the treatment received, and how well the cancer responds to treatment.

Your doctor can tell you how these numbers might apply to you, as he or she is familiar with your particular situation.

**Breast cancer survival rates, by stage**
The outlook for women with breast cancer varies by the stage (extent) of the cancer. In general, the survival rates are better for women with earlier stage cancers. But remember, the outlook for each woman is specific to her circumstances. The numbers below come from the National Cancer Institute’s SEER database, looking at people diagnosed with breast cancer between 2007 and 2013.

- The 5-year relative survival rate for women with stage 0 or stage I breast cancer is close to 100%.
- For women with stage II breast cancer, the 5-year relative survival rate is about 93%.
- The 5-year relative survival rate for stage III breast cancers is about 72%. But often, women with these breast cancers can be treated successfully.
- Breast cancers that have spread to other parts of the body are more difficult to treat and tend to have a poorer outlook. Metastatic, or stage IV breast cancers, have a 5-year relative survival rate of about 22%. Still, there are often many treatment options available for women with this stage of breast cancer.

Remember, these survival rates are only estimates – they can’t predict what will happen to any individual. We understand that these statistics can be confusing and may lead you to have more questions. Talk to your doctor to better understand your specific situation.

*Please note that these statistics are based on the previous version of AJCC staging. In that version stage II also included patients that would now be considered stage IB.*

- **References**

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**Questions to Ask Your Doctor About Breast Cancer**
It’s important to be able to have frank, open discussions with your cancer care team. They want to answer all of your questions, so that you can make informed treatment and life decisions.

Here are some questions that you can use to help better understand your cancer and your treatment options. Don’t be afraid to take notes and tell the doctors or nurses when you don’t understand what they’re saying. You might want to bring another person with you when you see your doctor and have them take notes to help you remember what was said.

Not all of these questions will apply to you, but they should help get you started. Be sure to write down some questions of your own. For instance, you might want more information about recovery times or you may want to ask about nearby or online support groups where you can talk with other women going through similar situations. You may also want to ask if you qualify for any clinical trials.

Keep in mind that doctors aren’t the only ones who can give you information. Other health care professionals, such as nurses and social workers, can answer some of your questions. To find out more about speaking with your health care team, see The Doctor-Patient Relationship.

**When you’re told you have breast cancer**

- Exactly what type of breast cancer do I have?
- How big is the cancer? Where exactly is it?
- Has the cancer spread to my lymph nodes or other organs?
- What’s the stage of the cancer? What does that mean?
- Will I need any other tests before we can decide on treatment?
- Do I need to see any other doctors or health professionals?
- What is the hormone receptor status of my cancer? What does this mean?
- What is the HER2 status of my cancer? What does this mean?
- How do these factors affect my treatment options and long-term outlook (prognosis)?
- What are my chances of survival, based on my cancer as you see it?
- Should I think about genetic testing? What would the pros and cons of testing be?
- How do I get a copy of my pathology report?
- If I’m concerned about the costs and insurance coverage for my diagnosis and treatment, who can help me?
When deciding on a treatment plan

- How much experience do you have treating this type of cancer?
- Should I get a second opinion? How do I do that?
- What are my treatment choices?
- What treatment do you recommend and why?
- Should I think about taking part in a clinical trial?
- What would the goal of the treatment be?
- How soon do I need to start treatment?
- How long will treatment last? What will it be like? Where will it be done?
- What should I do to get ready for treatment?
- What risks or side effects are there to the treatments you suggest? Are there things I can do to reduce these side effects?
- How will treatment affect my daily activities? Can I still work fulltime?
- Will I lose my hair? If so, what can I do about it?
- Will I go through menopause as a result of the treatment? Will I be able to have children after treatment? Would I be able to breastfeed?
- What are the chances the cancer will come back (recur) after this treatment?
- What would we do if the treatment doesn’t work or if the cancer comes back?
- What if I have transportation problems getting to and from treatment?

If you need surgery

- Is breast-conserving surgery (lumpectomy) an option for me? Why or why not?
- What are the pros and cons of breast-conserving surgery versus mastectomy?
- How many surgeries like mine have you done?
- Will you have to take out lymph nodes? If so, would you advise a sentinel lymph node biopsy? Why or why not?
- What side effects might lymph node removal cause?
- How long will I be in the hospital?
- Will I have stitches or staples at the surgery site? Will there be a drain (tube) coming out of the site?
- How do I care for the surgery site? Will I need someone to help me?
- What will my breasts look and feel like after my treatment? Will I have normal feeling in them?
- What will the scar look like?
- Is breast reconstruction surgery an option if I want it? What would it mean in my
During treatment

Once treatment begins, you'll need to know what to expect and what to look for. Not all of these questions may apply to you, but asking the ones that do may be helpful.

- How will we know if the treatment is working?
- Is there anything I can do to help manage side effects?
- What symptoms or side effects should I tell you about right away?
- How can I reach you on nights, holidays, or weekends?
- Will I need to change what I eat during treatment?
- Are there any limits on what I can do?
- Can I exercise during treatment? If so, what kind of exercise should I do, and how often?
- Can you suggest a mental health professional I can see if I start to feel overwhelmed, depressed, or distressed?
- Will I need special tests, such as imaging scans or blood tests? How often?

After treatment

- Will I need a special diet after treatment?
- Are there any limits on what I can do?
- Am I at risk for lymphedema?
- What can I do to reduce my risk for lymphedema?
- What should I do if I notice swelling in my arm?
- What other symptoms should I watch for? What kind of exercise should I do now?
- What type of follow-up will I need after treatment?
- How often will I need to have follow-up exams, blood tests, or imaging tests?
- How will we know if the cancer has come back? What should I watch for?
• What will my options be if the cancer comes back?

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Treating Breast Cancer

Which treatments are used for breast cancer?

There are several ways to treat breast cancer, depending on its type and stage.

**Local treatments:** Some treatments are *local*, meaning they treat the tumor without affecting the rest of the body. Types of local therapy used for breast cancer include:

- Surgery
- Radiation therapy

**Systemic treatments:** Drugs used to treat breast cancer are considered *systemic* therapies because they can reach cancer cells almost anywhere in the body. They can be given by mouth or put directly into the bloodstream. Depending on the type of breast cancer, different types of drug treatment might be used, including:

- Chemotherapy
- Hormone therapy
- Targeted therapy

Many women get more than one type of treatment for their cancer.

How is breast cancer typically treated?

Most women with breast cancer will have some type of surgery to remove the tumor. Depending on the type of breast cancer and how advanced it is, you might need other types of treatment as well, either before or after surgery, or sometimes both.

Typically, treatment plans are based on the type of breast cancer, its stage, and any special situations:

- Invasive breast cancer (stages I-IV)
Ductal carcinoma in situ (DCIS)
Lobular carcinoma in situ (LCIS)
Inflammatory breast cancer
Breast cancer during pregnancy
Triple-negative breast cancer

Your treatment plan will depend on other factors as well, including your overall health and personal preferences.

Who treats breast cancer?

Doctors on your cancer treatment team might include:

- A breast surgeon or surgical oncologist: a doctor who uses surgery to treat breast cancer
- A radiation oncologist: a doctor who uses radiation to treat cancer
- A medical oncologist: a doctor who uses chemotherapy and other medicines to treat cancer
- A plastic surgeon: a doctor who specializes in reconstructing or repairing parts of the body

Many other specialists might be part of your treatment team as well, including physician assistants, nurse practitioners, nurses, psychologists, social workers, nutritionists, genetic counselors, and other health professionals. See Health Professionals Associated With Cancer Care for more on this.

Making treatment decisions

It’s important to discuss all of your treatment options, including their goals and possible side effects, with your doctors to help make the decision that best fits your needs. It’s also very important to ask questions if there is anything you’re not sure about. See Questions to Ask Your Doctor About Breast Cancer for ideas.

Getting a second opinion

You might also want to get a second opinion. This can give you more information and help you feel more certain about the treatment plan you choose. If you aren’t sure where to go for a second opinion, ask your doctor for help.
Thinking about taking part in a clinical trial

Clinical trials are carefully controlled research studies that are done to get a closer look at promising new treatments or procedures. Clinical trials are one way to get state-of-the-art cancer treatment. In some cases they may be the only way to get access to newer treatments. They are also the best way for doctors to learn better methods to treat cancer. Still, they are not right for everyone.

If you would like to learn more about clinical trials that might be right for you, start by asking your doctor if your clinic or hospital conducts clinical trials. See Clinical Trials to learn more.

Considering complementary and alternative methods

You may hear about alternative or complementary methods to treat your cancer or relieve symptoms that your doctor hasn’t mentioned.

- **Complementary** methods are treatments that are used along with your regular medical care.
- **Alternative** treatments are used instead of a doctor’s medical treatment.

These methods can include vitamins, herbs, and special diets, or other methods such as acupuncture or massage, to name a few. Be sure to talk to your cancer care team about any method you are thinking about using. They can help you learn what is known (or not known) about the method, which can help you make an informed decision. Although some of these methods might be helpful in relieving symptoms or helping you feel better, many have not been proven to work. Some might even be dangerous. See Complementary and Alternative Medicine to learn more.

Choosing to stop treatment or choosing no treatment at all

For some people, when treatments have been tried and are no longer controlling the cancer, it could be time to weigh the benefits and risks of continuing to try new treatments. Whether or not you continue treatment, there are things you can do to help maintain or improve your quality of life. Learn more in If Cancer Treatments Are No Longer Working.

Some people, especially if the cancer is advanced, might not want to be treated at all. There are many reasons people might choose to not get cancer treatment, but it’s important to talk to your doctors and make that decision. Remember that even if you choose not to treat the cancer, you can still get supportive care to help with pain or
other symptoms.

**Help getting through breast cancer treatment**

Your cancer care team will be your first source of information and support, but there are many places you can get more help if you need it. Hospital- or clinic-based support services are an important part of your care. These might include nurse or social work services, financial aid, nutritional advice, rehab, or spiritual help.

The American Cancer Society also has programs and services – including rides to treatment, lodging, and more – to help you get through treatment. Call us at 1-800-227-2345 and speak to one of our trained cancer information specialists.

**Surgery for Breast Cancer**

Most women with breast cancer have some type of surgery as part of their treatment. There are different types of breast surgery, and it may be done for different reasons, depending on the situation. For example, surgery may be done to:

- Remove as much of the cancer as possible (breast-conserving surgery or mastectomy)
- Find out whether the cancer has spread to the lymph nodes under the arm (sentinel lymph node biopsy or axillary lymph node dissection)
- Restore the breast’s shape after the cancer is removed (breast reconstruction)
- Relieve symptoms of advanced cancer

Your doctor may recommend a certain operation based on your breast cancer features and your medical history, or you may have a choice about which type to have. It’s important to know your options so you can talk about them with your doctor and make the choice that is right for you.

**Surgery to remove breast cancer**

There are two main types of surgery to remove breast cancer:

- **Breast-conserving surgery** (also called a lumpectomy, quadrantectomy, partial mastectomy, or segmental mastectomy) – A surgery in which only the part of the breast containing the cancer is removed. The goal is to remove the cancer as well
as some surrounding normal tissue. How much of the breast is removed depends on the size and location of the tumor and other factors.

- **Mastectomy** – A surgery in which the entire breast is removed, including all of the breast tissue and sometimes other nearby tissues. There are several different types of mastectomies. Some women may also get a double mastectomy, in which both breasts are removed.

### Choosing between breast-conserving surgery and mastectomy

Many women with early-stage cancers can choose between breast-conserving surgery (BCS) and mastectomy. The main advantage of BCS is that a woman keeps most of her breast. But in most cases she will also need radiation. Women who have mastectomy for early stage cancers are less likely to need radiation.

For some women, mastectomy may be a better option, because of the type of breast cancer, the large size of the tumor, previous treatment history, or certain other factors.

Some women might be worried that having a less extensive surgery might raise their risk of the cancer coming back. But the fact is, in most cases, mastectomy does not give you any better chance of long-term survival or a better outcome from treatment. Studies following thousands of women for more than 20 years show that when BCS can be done along with radiation, having a mastectomy instead does not provide any better chance of survival.

### Surgery to remove nearby lymph nodes

To find out if the breast cancer has spread to axillary (underarm) lymph nodes, one or more of these lymph nodes will be removed and looked at under the microscope. This is an important part of figuring out the stage (extent) of the cancer. Lymph nodes may be removed either as part of the surgery to remove the breast cancer or as a separate operation.

The two main types of surgery to remove lymph nodes are:

- **Sentinel lymph node biopsy (SLNB)** – A procedure in which the surgeon removes only the lymph node(s) under the arm to which the cancer would likely spread first. Removing only one or a few lymph nodes lowers the risk of side effects from the surgery.
- **Axillary lymph node dissection (ALND)** – A procedure in which the surgeon
removes many (usually less than 20) lymph nodes from under the arm. ALND is not
done as often as it was in the past, but it might still be the best way to look at the
lymph nodes in some situations.
To learn more about these procedures and when they might be done, see Lymph Node
Surgery for Breast Cancer.

Breast reconstruction after surgery

Any women undergoing surgery for breast cancer may have the option of breast
reconstruction. In the case of a mastectomy, a woman might want to consider having
the breast mound rebuilt to restore the breast’s appearance after surgery. In some
breast-conserving surgeries, a woman may consider having fat grafting in the affected
breast to correct any dimples left from the surgery. The options will depend on each
women’s specific situation.

There are several types of reconstructive surgery, although your options may depend
on your medical situation and personal preferences. You may have a choice between
having breast reconstruction at the same time as the breast cancer surgery (immediate
reconstruction) or at a later time (delayed reconstruction).

If you are thinking about having reconstructive surgery, it’s a good idea to discuss it with
your breast surgeon and a plastic surgeon before your mastectomy or BCS. This gives
the surgical team time to plan out the treatment options that might be best for you, even
if you wait and have the reconstructive surgery later.

To learn about different breast reconstruction options, see our section on breast
reconstruction.

Surgery for advanced breast cancer

Although surgery is very unlikely to cure breast cancer that has spread to other parts of
the body, it can still be helpful in some situations, either as a way to slow the spread of
the cancer, or to help prevent or relieve symptoms from it. For example, surgery might
be used:

• When the breast tumor is causing an open wound in the breast (or chest)
• To treat a small number of areas of cancer spread (metastases) in a certain part of
  the body, such as the brain
• When an area of cancer spread is pressing on the spinal cord
To treat a blockage in the liver
To provide relief of pain or other symptoms

If your doctor recommends surgery for advanced breast cancer, it’s important that you understand its goal—whether it’s to try to cure the cancer or to prevent or treat symptoms.

Wire localization to guide surgery

Sometimes, if the cancer in your breast can’t be felt, is hard to find, and/or is difficult to get to, a mammogram or ultrasound may be used to place a wire in the cancerous area to guide the surgeon to the right spot. This is called wire localization or needle localization. If a mammogram is used you may hear the term stereotactic wire localization. Rarely, a MRI might be used if the mammogram or ultrasound are not successful.

After your breast is numbed, a mammogram or ultrasound is used to guide a thin hollow needle to the abnormal area. Once the tip of the needle is in the right spot, a thin wire is put in through the center of the needle. A small hook at the end of the wire keeps it in place. The needle is then taken out. The surgeon uses the wire as a guide to the part of the breast to be removed.

The surgery done as part of the wire localization may be enough to count as breast conserving surgery if the margins are negative. If cancer cells are found at the edge of the removed tissue (also called a positive margin), more surgery may be required.

It should be noted that a wire-localization procedure is sometimes used to perform a surgical biopsy of a suspicious area in the breast to determine if it is cancer or not.

References


Breast-conserving surgery (Lumpectomy)

Breast-conserving surgery (BCS) is an operation to remove the cancer while leaving as much normal breast as possible. Some surrounding healthy tissue and lymph nodes are usually also removed. How much of the breast is removed depends on the size and location of the tumor and other factors. Breast-conserving surgery is sometimes called lumpectomy, quadrantectomy, partial mastectomy, or segmental mastectomy. It’s often an option for a woman with early-stage cancer, and allows her to keep most of her breast.
Breast-conserving surgery allows a woman to keep most of her breast, but makes it likely she will also need radiation.

Not all women with breast cancer are candidates for BCS. Talk to your doctor to find out whether BCS is an option for you.

Studies show that choosing BCS (plus radiation) over mastectomy does not affect a woman’s chances of long-term survival.

If you think you may want breast reconstruction, talk to your doctor before your breast cancer surgery.

After BCS, most women will have radiation therapy. Some women might get other treatments as well, such as hormone therapy or chemotherapy.

Side effects of BCS may include pain, a scar and/or dimple where the tumor was removed, a firm or hard surgical scar, and sometimes lymphedema, a type of swelling, in the arm.

Who can get breast-conserving surgery?

Breast-conserving surgery (BCS) is a good option for many women with early-stage
cancers. The main advantage is that a woman keeps most of her breast. However, she will in most cases also need radiation therapy, given by a radiation oncologist (a doctor who specializes in radiation). Women who have their entire breast removed (mastectomy) for early stage cancers are less likely to need radiation, but they may be referred to a radiation oncologist for evaluation because each patient’s cancer is unique.

BCS might be a good option if you:

- Are very concerned about losing your breast
- Are willing to have radiation therapy and able to get to the appointments
- Have not already had your breast treated with radiation therapy or BCS
- Have only one area of cancer on the breast, or multiple areas that are close enough to be removed together without changing the look of your breast too much
- Have a small tumor (5 cm [2 inches] or smaller), which is also small relative to your breast size
- Are not pregnant or, if pregnant, will not need radiation therapy immediately (to avoid risking harm to the fetus)
- Do not have a genetic factor such as a BRCA mutation, which might increase your chance of a second cancer
- Do not have certain serious connective tissue diseases such as scleroderma or lupus, which may make you especially sensitive to the side effects of radiation therapy
- Do not have inflammatory breast cancer

**Recovering from breast-conserving surgery: What to expect after surgery**

This type of surgery is typically done in an outpatient surgery center, and an overnight stay in the hospital is usually not needed. Most women should be fairly functional after going home and can often return to their regular activities within 2 weeks. Some women may need help at home depending on how extensive their surgery was.

Ask a member of your health care team how to care for your surgery site and affected arm. Usually, you and your caregivers will get written instructions about care after surgery. These instructions should cover:

- How to care for the surgery site and dressing
- How to care for your drain, if you have one (This is a plastic or rubber tube coming
out of the surgery site that removes the fluid that collects during healing.)

- How to recognize signs of infection
- Bathing and showering after surgery
- When to call the doctor or nurse
- When to start using your arm again and how to do arm exercises to prevent stiffness
- When you can start wearing a bra again
- What to eat and not to eat
- Use of medicines, including pain medicines and possibly antibiotics
- Any restrictions on activity
- What to expect regarding sensations or numbness in the breast and arm
- What to expect regarding feelings about body image
- When to see your doctor for a follow-up appointment
- Referral to a Reach To Recovery volunteer. Through our Reach To Recovery program, a specially trained volunteer who has had breast cancer can provide information, comfort, and support.

**Side effects of breast-conserving surgery**

Side effects of breast-conserving surgery can include:

- Pain or tenderness or a "tugging" sensation in the breast
- Temporary swelling
- Hard scar tissue that forms in the surgical site
- Change in the shape of the breast
- Nerve (neuropathic) pain (sometimes described as burning or shooting pain) in the chest wall, armpit, and/or arm that doesn’t go away over time. This can also happen in mastectomy patients and is called post-mastectomy pain syndrome or PMPS.

As with all operations, bleeding and infection at the surgery site are also possible. If axillary lymph nodes are also removed, other side effects such as lymphedema may occur.

**How can the doctors be sure all of the cancer was removed?**

During the surgery, the surgeon will try to remove all of the cancer, plus some surrounding normal tissue.
After surgery is complete, a doctor, called a pathologist, will use a microscope to look at the tissue that was removed. If the pathologist finds no cancer cells at any of the edges of the removed tissue, it is said to have negative or clear margins. Sometimes breast cancer cells spread past what the imaging studies are able to show. So if microscopic (smaller than the human eye can see) cancer cells are found at the edges of the tissue, it is said to have positive margins.

The presence of positive margins means that some cancer cells may still be in the breast after surgery, so the surgeon may need to go back and remove more tissue. This operation is called a re-excision. If cancer cells are still found at the edges of the removed tissue after the second surgery, a mastectomy may be needed.

**Will I need breast reconstruction surgery after breast-conserving surgery?**

Before your surgery, talk to your breast surgeon about how breast-conserving surgery might change the look of your breast. The larger the portion of breast removed, the more likely it is that you will see a change in the shape of the breast afterward. If your breasts look very different after surgery, it may be possible to have some type of reconstructive surgery or to have the size of the unaffected breast reduced to make the breasts more symmetrical (even). It may even be possible to have this done during the initial surgery. It’s very important to talk with your doctor (and possibly a plastic surgeon) before the cancer surgery to get an idea of how your breasts are likely to look afterward, and to learn what your options might be.

**Will more treatment be needed after breast-conserving surgery?**

Most women will need radiation therapy to the breast after breast-conserving surgery. Sometimes, to make it easier to aim the radiation, small metallic clips (which will show up on x-rays) may be placed inside the breast during surgery to mark the area.

Many women receive hormone therapy after surgery to help lower the risk of the cancer coming back. Some women might also need chemotherapy after surgery. If so, radiation therapy is usually delayed until the chemotherapy is completed.

- **References**


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Mastectomy

Mastectomy is a way of treating breast cancer by removing the entire breast through surgery. It’s often done when a woman cannot be treated with breast-conserving surgery (lumpectomy), which spares most of the breast. It can also be done if a woman chooses mastectomy over breast-conserving surgery for personal reasons. Women at very high risk of getting a second cancer sometimes have a double mastectomy, the removal of both breasts.

Types of mastectomies

There are several different types of mastectomies, based on how the surgery is done and how much tissue is removed.

Simple (or total) mastectomy

In this procedure, the surgeon removes the entire breast, including the nipple, areola, and skin. Some underarm lymph nodes may or may not be removed depending on the situation. Most women, if they are hospitalized, can go home the next day.

Skin-sparing mastectomy

In this procedure, most of the skin over the breast is left intact. Only the breast tissue, nipple and areola are removed. The amount of breast tissue removed is the same as with a simple mastectomy. Implants or tissue from other parts of the body are used at the time of surgery to reconstruct the breast.

Many women prefer skin-sparing mastectomy because it offers the advantage of less scar tissue and a reconstructed breast that seems more natural. But it may not be suitable for larger tumors or those that are close to the surface of the skin.

The risk of local cancer recurrence with this type of mastectomy is the same as with other types of mastectomies.

Nipple-sparing mastectomy

Nipple-sparing mastectomy is a variation of the skin-sparing mastectomy. In this procedure, the breast tissue is removed, but the breast skin and nipple are left in place.
This can be followed by breast reconstruction. The surgeon often removes the breast tissue beneath the nipple (and areola) during the procedure to check for cancer cells. If cancer is found in this tissue, the nipple must be removed. Even if no cancer is found under the nipple, some doctors give the nipple tissue a dose of radiation during or after the surgery to try to reduce the risk of the cancer coming back.

It is more often an option for women who have a small, early-stage cancer near the outer part of the breast, with no signs of cancer in the skin or near the nipple. Cancer cells are more likely to be hidden in the nipple if the breast tumor is larger or close to the nipple. This means there is a higher risk the cancer will come back if the nipple is not removed.

There are still some issues with nipple-sparing surgeries. Afterward, the nipple may not have a good blood supply, causing the tissue to shrink or become deformed. Because the nerves are also cut, there often may be little or no feeling left in the nipple. For women with larger breasts, the nipple may look out of place after the breast is reconstructed. As a result, many doctors feel that this surgery is best done in women with small to medium sized breasts. This procedure leaves less visible scars, but if it isn't done properly, it can leave behind more breast tissue than other forms of mastectomy. This could result in a higher risk of cancer developing than for a skin-sparing or simple mastectomy. This was more of a problem in the past, but improvements in technique have helped make this surgery safer. Still, many experts do not yet consider nipple-sparing mastectomy to be a standard treatment for breast cancer.

**Modified radical mastectomy**

A modified radical mastectomy combines a simple mastectomy with the removal of the lymph nodes under the arm (called an *axillary lymph node dissection*).
Radical mastectomy

In this extensive operation, the surgeon removes the entire breast, axillary (underarm) lymph nodes, and the pectoral (chest wall) muscles under the breast. This surgery was once very common, but less extensive surgery (such as the modified radical mastectomy) has been found to be just as effective and with fewer side effects, so this surgery is rarely done now. This operation may still be done for large tumors that are growing into the pectoral muscles.

Double mastectomy

If a mastectomy is done on both breasts, it is called a double (or bilateral) mastectomy. When this is done, it is often a risk-reducing surgery for women at very high risk for getting breast cancer, such as those with a BRCA gene mutation. Most of these mastectomies are simple mastectomies, but some may be nipple-sparing.
Who should get a mastectomy?

Many women with early-stage cancers can choose between breast-conserving surgery (BCS) and mastectomy. You may have an initial gut preference for mastectomy as a way to "take it all out as quickly as possible." But the fact is that in most cases, mastectomy does not give you any better chance of long-term survival or a better outcome from treatment. Studies following thousands of women for more than 20 years show that when BCS can be done with radiation, doing a mastectomy instead does not provide any better chance of survival.

Although most women and their doctors prefer BCS (with radiation therapy) when it's a reasonable option, there are cases where mastectomy is likely to be the best choice. For example, mastectomy might be recommended if you:

- Are unable to have radiation therapy
- Would prefer a more extensive surgery instead of having radiation therapy
- Have had the breast treated with radiation therapy in the past
- Have already had BCS along with re-excision(s) that did not completely remove the cancer
- Have two or more areas of cancer in the same breast that are not close enough to be removed together without changing the look of the breast too much
- Have a larger tumor (greater than 5 cm [2 inches] across), or a tumor that is large relative to your breast size
- Are pregnant and would need radiation therapy while still pregnant (risking harm to the fetus)
- Have a genetic factor such as a *BRCA* mutation, which might increase your chance of a second cancer
- Have a serious connective tissue disease such as scleroderma or lupus, which may make you especially sensitive to the side effects of radiation therapy
- Have inflammatory breast cancer

For women who are worried about breast cancer recurrence, it is important to understand that having a mastectomy instead of breast-conserving surgery plus radiation *only* lowers your risk of developing a second breast cancer in the same breast. It does not lower the chance of the cancer coming back in other parts of the body.

Should I have breast reconstruction surgery after mastectomy?
After having a mastectomy a woman might want to consider having the breast mound rebuilt to restore the breast's appearance. This is called breast reconstruction. Although each case is different, most mastectomy patients can have reconstruction. Reconstruction can be done at the same time as the mastectomy or sometime later.

If you are thinking about having reconstructive surgery, it’s a good idea to discuss it with your surgeon and a plastic surgeon before your mastectomy. This allows the surgical teams to plan the treatment that’s best for you, even if you wait and have the reconstructive surgery later. Insurance companies typically cover breast reconstruction, but you should check with your insurance company so you know what is covered.

Some women choose not to have reconstructive surgery. Wearing a breast prosthesis (breast form) is an option for women who want to have the contour of a breast under their clothes without having surgery. Some women are also comfortable with just ‘going flat,’ especially if both breasts were removed.

Recovering from a mastectomy: What to expect after surgery

In general, women having a mastectomy stay in the hospital for 1 or 2 nights and then go home. However, some women may be placed in a 23-hour, short-stay observation unit before going home. How long it takes to recover from surgery depends on what procedures were done, and some women may need help at home. Most women should be fairly functional after going home and can often return to their regular activities within about 4 weeks. Recovery time is longer if breast reconstruction was done as well, and it can take months to return to full activity after some procedures.

Ask your health care team how to care for your surgery site and arm. Usually, you and your caregivers will get written instructions about care after surgery. These instructions should cover:

- How to care for the surgery site and dressing
- How to care for your drain, if you have one (this is a plastic or rubber tube to coming out of the surgery site attached to a soft rubber ball that collects the fluid that occurs during healing)
- How to recognize signs of infection
- Bathing and showering after surgery
- When to call the doctor or nurse
- When to start using your arm again and how to do arm exercises to prevent
stiffness
• When you can start wearing a bra again
• When to begin using a prosthesis and what type to use
• What to eat and not to eat
• Use of medicines, including pain medicines and possibly antibiotics
• Any restrictions on activity
• What to expect regarding sensations or numbness in the breast and arm
• What to expect regarding feelings about body image
• When to see your doctor for a follow-up appointment
• Referral to a Reach To Recovery volunteer. Through our Reach To Recovery program, a specially trained volunteer who has had breast cancer can provide information, comfort, and support.

Side effects of mastectomy

To some extent, the side effects of mastectomy can depend on the type of mastectomy you have (with more extensive surgeries tending to have more side effects). Side effects can include:

• Pain or tenderness
• Swelling at the surgery site
• Buildup of blood in the wound (hematoma)
• Buildup of clear fluid in the wound (seroma)
• Limited arm or shoulder movement
• Numbness in the chest or upper arm
• Nerve (neuropathic) pain (sometimes described as burning or shooting pain) in the chest wall, armpit, and/or arm that doesn’t go away over time. It is also called post-mastectomy pain syndrome or PMPS.

As with all operations, bleeding and infection at the surgery site are also possible. If axillary lymph nodes are also removed, other side effects such as lymphedema may occur.

Will more treatment be needed after mastectomy?

Some women might get other treatments after a mastectomy, such as radiation therapy, hormone therapy, chemotherapy, or targeted therapy. Talk to your doctor about what to expect.
References


Lymph Node Surgery for Breast Cancer

If breast cancer spreads, it typically goes first to nearby lymph nodes. Knowing whether the cancer has spread to your lymph nodes helps medical providers find the best way to treat your cancer.

If you have been diagnosed with breast cancer, it’s important to find out how far the cancer has spread. To help find out if the cancer has spread beyond the breast, one or more of the lymph nodes under the arm (axillary lymph nodes) are removed and checked under a microscope. This is an important part of staging. When the lymph nodes contain cancer cells, there is a higher chance that cancer cells have also spread to other parts of the body. Treatment decisions will often depend on whether cancer is found in the lymph nodes.

Lymph node removal can be done in different ways, depending on whether any lymph nodes are enlarged, how big the breast tumor is, and other factors.

Biopsy of an enlarged lymph node

If any of the lymph nodes under the arm or around the collar bone are swollen, they may be checked for cancer spread directly with a needle biopsy (either a fine needle aspiration [FNA] or a core needle biopsy). Less often, the enlarged node is removed with surgery. If cancer is found in the lymph node, more nodes will need to be removed during an axillary lymph node dissection (described below).

Types of lymph node surgery
Even if the nearby lymph nodes are not enlarged, they will still need to be checked for cancer. This can be done in two different ways. Sentinel lymph node biopsy is the most common and least invasive way, but in some cases a more extensive axillary lymph node dissection might be needed.

Lymph node surgery is often done as part of the main surgery to remove the breast cancer, but in some cases it might be done as a separate operation.

**Sentinel lymph node biopsy (SLNB)**

In a sentinel lymph node biopsy (SLNB), the surgeon finds and removes the first lymph node(s) to which a tumor is likely to spread (called the sentinel nodes). To do this, the surgeon injects a radioactive substance and/or a blue dye into the tumor, the area around it, or the area around the nipple. Lymphatic vessels will carry these substances along the same path that the cancer would likely take. The first lymph node(s) the dye or radioactive substance travels to will be the sentinel node(s).
After the substance has been injected, the sentinel node(s) can be found either by using a special device to detect radioactivity in the nodes, or by looking for nodes that have turned blue. To double check, both methods are often used. The surgeon cuts the skin over the area and removes the node(s) containing the dye or radioactivity. The few removed lymph nodes are then checked closely for cancer cells by a doctor called a pathologist. This is sometimes done during the surgery. This way, if cancer is found in the sentinel lymph node(s), the surgeon may go ahead with a full axillary dissection (ALND) to remove more lymph nodes while you are still on the operating table. If no cancer cells are seen in the node(s) at the time of the surgery, or if the sentinel node(s) are not checked by a pathologist at the time of the surgery, they will be examined more closely over the next several days.
If cancer is found in the sentinel node(s) later, the surgeon may recommend a full ALND at a later time to check more nodes for cancer. Recently, however, studies have shown that in some cases it may be just as safe to leave the rest of the lymph nodes behind. This is based on certain factors, such as the size of the breast tumor, what type of surgery is used to remove the tumor, and what treatment is planned after surgery. Based on the studies that have looked at this, skipping the ALND may be an option for women with tumors 5 cm (2 inches) or smaller who are having breast-conserving surgery followed by radiation. For some women who have had mastectomy and will also have radiation, skipping the ALND might be an option.

If there is no cancer in the sentinel node(s), it's very unlikely that the cancer has spread to other lymph nodes, so no further lymph node surgery is needed.

Although SLNB has become a common procedure, it requires a great deal of skill. It should be done only by a surgeon who has experience with this technique. If you are thinking about having this type of biopsy, ask your health care team if they do them regularly.

**Axillary lymph node dissection (ALND)**

In this procedure, anywhere from about 10 to 40 (though usually less than 20) lymph nodes are removed from the area under the arm (axilla) and checked for cancer spread. ALND is usually done at the same time as a mastectomy or breast-conserving surgery (BCS), but it can be done in a second operation. This was once the most common way to check for breast cancer spread to nearby lymph nodes, and it is still sometimes needed. For example, an ALND may be done if a previous biopsy has shown one or more of the underarm lymph nodes have cancer cells.
Side effects of lymph node surgery

As with any operation, pain, swelling, bleeding, blood clots, and infection are possible.

Lymphedema

A possible long-term effect of lymph node surgery is swelling in the arm or chest called lymphedema. Because any excess fluid in the arms normally travels back into the bloodstream through the lymphatic system, removing the lymph nodes sometimes blocks drainage from the arm, causing this fluid to build up.
This is less common after a sentinel lymph node biopsy (SLNB) than an axillary lymph node dissection (ALND).

The risk is thought to be in the range of 3-7% in women who have a SLNB and around 30% in women who have a ALND. It may be more common if radiation is given after surgery or in women who are obese. Sometimes the swelling lasts for only a few weeks and then goes away. But in some women, it lasts a long time. If your arm is swollen, tight, or painful after lymph node surgery, be sure to tell someone on your cancer care team right away.

**Limited arm and shoulder movement**

You might also have **limited movement in your arm and shoulder** after surgery. This is more common after ALND than SLNB. Your doctor may advise exercises to help keep you from having permanent problems (a frozen shoulder).
Some women notice a rope-like structure that begins under the arm and can extend down toward the elbow. This is sometimes called **axillary web syndrome** or **lymphatic cording**. It is more common after ALND than SLNB. Symptoms may not appear for weeks or even months after surgery. It can cause pain and limit movement of the arm and shoulder. This often goes away without treatment, although some women may find physical therapy helpful.

**Numbness**

**Numbness** of the skin on the upper, inner arm is a common side effect because the nerve that controls sensation here travels through the lymph node area.

- References


Morrow M, Burstein HJ, Harris JR. Chapter 79: Malignant Tumors of the Breast. In:
Many women with breast cancer have some kind of surgery, even though other kinds of treatment are done, too. You may have had a:

- Breast biopsy
• Lymph node biopsy or removal
• Breast conservation surgery (lumpectomy)
• Mastectomy
• Breast reconstruction

Any of these can affect how well you can move your shoulder and arm, take a deep breath, or do your daily activities, like dressing, bathing, and combing your hair. Pain and stiffness can cause weakness and limit movement of your arm and shoulder.

**Exercises can help restore movement.**

No matter what type of surgery you have, it’s important to do exercises afterward to get the arm and shoulder moving again. Exercises help to decrease side effects of your surgery and help you get back to your usual activities.

If you’ve had radiation therapy after surgery, exercises are even more important to help keep your arm and shoulder flexible. Radiation may affect your arm and shoulder long after treatment is finished. Because of this, it’s important to develop a regular habit of doing exercises to maintain arm and shoulder mobility after radiation treatments for breast cancer.

It’s very important to talk with your doctor before starting any exercises so that you can decide on a program that’s right for you. Your doctor might suggest you see a physical therapist or occupational therapist, or a cancer exercise specialist certified by the American College of Sports Medicine. These health professionals are specially trained to design an exercise program just for you. You might need this kind of help if you do not have full use of your arm within 3 to 4 weeks of surgery.

Some exercises should not be done until drains and sutures (stitches) are removed. But some exercises can be done soon after surgery. The exercises that increase your shoulder and arm motion can usually be started in a few days. Exercises to help make your arm stronger are added later.

**The week after surgery**

The tips and exercises listed below should be done for the first 3 to 7 days after surgery. **Do not do them until you get the OK from your doctor.**

• Use your affected arm (on the side where your surgery was) as you normally would when you comb your hair, bathe, get dressed, and eat.
• Lie down and raise your affected arm above the level of your heart for 45 minutes. Do this 2 or 3 times a day. Put your arm on pillows so that your hand is higher than your wrist and your elbow is a little higher than your shoulder. This will help decrease the swelling that may happen after surgery.

• Exercise your affected arm while it’s raised above the level of your heart by opening and closing your hand 15 to 25 times. Next, bend and straighten your elbow. Repeat this 3 to 4 times a day. This exercise helps reduce swelling by pumping lymph fluid out of your arm.

• Practice deep breathing exercises (using your diaphragm) at least 6 times a day. Lie down on your back and take a slow, deep breath. Breathe in as much air as you can while trying to expand your chest and abdomen (push your belly button away from your spine). Relax and breathe out. Repeat this 4 or 5 times. This exercise will help maintain normal movement of your chest, making it easier for your lungs to work. Do deep breathing exercises often.

• Do not sleep on your affected arm or lie on that side.

**General guidelines for these exercises**

The exercises described here can be done as soon as your doctor says it's OK. They’re usually started a week or more after surgery. Be sure to talk to your doctor before trying any of them. Here are some things to keep in mind after breast surgery:

• You will feel some tightness in your chest and armpit after surgery. This is normal, and the tightness will decrease as you do your exercises.

• Many women have burning, tingling, numbness, or soreness on the back of the arm and/or on the chest wall. This is because the surgery can irritate some of your nerves. These feelings might increase a few weeks after surgery. But keep doing your exercises unless you notice unusual swelling or tenderness. (If this happens, let your doctor know about it right away.) Sometimes rubbing or stroking the area with your hand or a soft cloth can help make the area less sensitive.

• It may be helpful to do the exercises after a warm shower when muscles are warm and relaxed.

• Wear comfortable, loose clothing when doing the exercises.

• Do the exercises slowly until you feel a gentle stretch. Hold each stretch at the end of the motion and slowly count to 5. It’s normal to feel some pulling as you stretch the skin and muscles that have been shortened because of the surgery. Do not bounce or make any jerky movements when doing any of the exercises. You should not feel pain as you do them, only gentle stretching.
• Do each exercise 5 to 7 times. Try to do each exercise correctly. If you have trouble with the exercises, talk to your doctor. You may need to be referred to a physical or occupational therapist.
• Do the exercises twice a day until you get back your normal flexibility.
• Be sure to take deep breaths, in and out, as you do each exercise.
• The exercises are set up so that you start them lying down, move to sitting, and finish them standing up.

Here are some of the more common exercises that women do after breast surgery. Talk to your doctor or therapist about which of these are right for you and when you should start doing them. Do not start any of these exercises without talking to your doctor first.

Wand exercise

This exercise helps increase your ability to move your shoulders forward. You will need a broom handle, yardstick, or other stick-like object to use as the wand in this exercise. Do these exercises on a bed or the floor. Lie on your back with your knees bent and your feet flat.

• Hold the wand across your belly in both hands with your palms facing up.
• Lift the wand up over your head as far as you can. Use your unaffected arm to help lift the wand until you feel a stretch in your affected arm.
- Hold for 5 seconds.
- Lower arms and repeat 5 to 7 times.

**Elbow winging**

This exercise helps increase the movement in the front of your chest and shoulder. It may take many weeks of regular exercise before your elbows will get close to the bed or floor. Do these exercises on a bed or the floor. Lie on your back with your knees bent and your feet flat.

- Clasp your hands behind your neck with your elbows pointing toward the ceiling.
- Move your elbows apart and down toward the bed or floor.
- Repeat 5 to 7 times.

**Shoulder blade stretch**
This exercise helps increase your shoulder blade movement.

- Sit in a chair very close to a table with your back against the back of the chair.
- Place the unaffected arm on the table with your elbow bent and palm down. Do not move this arm during the exercise.
- Place the affected arm on the table, palm down, with your elbow straight.
- Without moving your trunk, slide the affected arm forward, toward the opposite side of the table. You should feel your shoulder blade move as you do this.
- Relax your arm and repeat 5 to 7 times.

**Shoulder blade squeeze**
This exercise also helps increase shoulder blade movement.

- Sit in a chair in front of a mirror. Face straight ahead. Do not rest against the back of the chair.
- Your arms should be at your sides with your elbows bent.
- Squeeze your shoulder blades together, bringing your elbows behind you. Keep your shoulders level as you do this. Do not lift your shoulders up toward your ears.
- Return to the starting position and repeat 5 to 7 times.

**Side bends**
This exercise helps increase movement of your trunk and body.

- Sit in a chair and clasp your hands together in front of you. Lift your arms slowly over your head, straightening your arms.
- When your arms are over your head, bend your trunk to the right keeping your arms overhead.
- Return to the starting position and bend to the left.
- Repeat 5 to 7 times.

**Chest wall stretch**
This exercise helps stretch your chest.

- Stand facing a corner with your toes about 8 to 10 inches from the corner.
- Bend your elbows and put your forearms on the wall, one on each side of the corner. Your elbows should be as close to shoulder height as possible.
- Keep your arms and feet in place and move your chest toward the corner. You will feel a stretch across your chest and shoulders.
- Return to the starting position and repeat 5 to 7 times.
- The picture shows stretching both sides at the same time, but you may find it more comfortable to stretch one arm at a time.
- Be sure you keep your shoulders dropped far away from your ears as you do this stretch.

Shoulder stretch
This exercise helps increase your mobility in your shoulder.

- Stand facing the wall with your toes about 8 to 10 inches from the wall.
- Put your hands on the wall. Use your fingers to “climb the wall,” reaching as high as you can until you feel a stretch.
- Return to the starting position and repeat 5 to 7 times.
- The picture shows both arms going up at the same time, but you might find it easier to raise one arm at a time.
- Be sure you keep your shoulders dropped far away from your ears as you raise your arms.

**Things to keep in mind after breast surgery**

Start exercising slowly and increase as you are able. Stop exercising and talk to your doctor right away if you:

- Get weaker, start losing your balance, or start falling
- Have pain that gets worse
- Have new heaviness, aching, tightness, or other strange sensations in your arm
- Have unusual swelling or swelling gets worse
- Have headaches, dizziness, blurred vision, new numbness, or tingling in your arms or chest
It’s important to exercise to keep your muscles working as well as possible, but it’s also important to be safe. Talk with your doctor about the right kind of exercises for your condition, and then set goals for increasing your level of physical activity.

Other kinds of exercise

Exercise to help improve aerobic (heart-lung) capacity is also important for women who have had breast cancer. There’s evidence that fitness and weight loss may even help lower the risk that some types of cancer will come back after treatment. Ask your doctor about fitness exercises during and after breast cancer treatment.

Other exercises are designed to help reduce your risk of lymphedema, or swelling in the arm on the side where you had surgery. The exercises shown here are mainly designed to help regain range of motion (flexibility) of the arm and shoulder. Ask your doctor about your lymphedema risk and if you should use exercises to help reduce that risk.

Strengthening exercises are now recommended as part of regular exercise programs to improve health. These are not started until 4 to 6 weeks after surgery, and must be tailored to your general health, medical condition, and fitness. Strength building starts by using small hand weights, and is increased slowly over time. Again, this is best addressed with your doctor or physical therapist. It’s probably best to start a strengthening program in a supervised setting with a cancer exercise trainer or physical therapist to be sure you’re doing the exercises properly.

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- References


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**Radiation for Breast Cancer**

Some women with breast cancer will need radiation, often in addition to other treatments. The need for radiation depends on what type of surgery you had, whether your cancer has spread to the lymph nodes or somewhere else in your body, and in some cases, your age. Tumors that are large or involve the skin might also need radiation. You could have just one type of radiation, or a combination of different types.

Radiation therapy is treatment with high-energy rays (such as x-rays) or particles that destroy cancer cells. Two main types of radiation therapy can be used to treat breast cancer:

- **External beam radiation**: This type of radiation comes from a machine outside the body.
- **Internal radiation (brachytherapy)**: For this treatment, a radioactive source is put inside the body for a short time.

**When might radiation therapy be used?**

Not all women with breast cancer need radiation therapy, but it may be used in several situations:

- After [breast-conserving surgery](#) (BCS), to help lower the chance that the cancer will come back in the breast or nearby lymph nodes.
- After a [mastectomy], especially if the cancer was larger than 5 cm (about 2 inches), or if cancer is found in the lymph nodes.
- If cancer has spread to other parts of the body, such as the bones or brain.
External beam radiation

This is the most common type of radiation therapy for women with breast cancer. A machine focuses the radiation on the area affected by the cancer.

Which areas need radiation depends on whether you had a mastectomy or breast-conserving surgery (BCS) and whether or not the cancer has reached nearby lymph nodes.

- If you had a mastectomy and no lymph nodes had cancer, radiation is focused on the chest wall, the mastectomy scar, and the places where any drains exited the body after surgery.
- If you had BCS, you will most likely have radiation to the entire breast (called whole breast radiation), and an extra boost of radiation to the area in the breast where the cancer was removed (called the tumor bed) to help prevent it from coming back in that area. The boost is often given after the treatments to the whole breast have ended. It uses the same machine, with lower amounts of radiation, but the beams are aimed at the tumor bed. Most women don’t notice different side effects from boost radiation than from whole breast radiation.
- If cancer was found in the lymph nodes under the arm (axillary lymph nodes), this area may be given radiation, as well. In some cases, the area treated might also include the nodes above the collarbone (supraclavicular lymph nodes) and the nodes beneath the breast bone in the center of the chest (internal mammary lymph nodes).

When will I get radiation therapy?

If you will need external radiation therapy after surgery, it is usually not started until your surgery site has healed, which is often a month or longer. If you are getting chemotherapy as well, radiation treatments are usually delayed until chemotherapy is complete.

Preparing for external beam radiation therapy

Before your treatment starts, the radiation team will carefully figure out the correct angles for aiming the radiation beams and the proper dose of radiation. They will make some ink marks or small tattoos on your skin to focus the radiation on the right area. Check with your health care team whether the marks they use will be permanent.
External radiation therapy is much like getting an x-ray, but the radiation is stronger. The procedure itself is painless. Each treatment lasts only a few minutes, but the setup time—getting you into place for treatment—usually takes longer.

Types and schedules of external beam radiation

The traditional schedule for getting whole breast radiation has been 5 days a week (Monday through Friday) for about 5 to 6 weeks. But many doctors are now using accelerated breast irradiation in select patients to give larger doses over a shorter time. There are several different types of accelerated breast irradiation:

- **Hypofractionated radiation therapy:** In this approach, radiation is given in larger doses using fewer treatments – typically for only 3 weeks. In women treated with breast-conserving surgery (BCS) and without cancer spread to underarm lymph nodes, this schedule has been shown to be just as good at keeping the cancer from coming back in the same breast as giving the radiation over 5 weeks. It might also lead to fewer short-term side effects.

- **Intraoperative radiation therapy (IORT):** In this approach, a single large dose of radiation is given in the operating room right after BCS (before the breast incision is closed). IORT requires special equipment and is not widely available.

- **3D-conformal radiotherapy:** In this technique, the radiation is given with special machines so that it is better aimed at the area where the tumor was removed (tumor bed). This allows more of the healthy breast to be spared. Treatments are given twice a day for 5 days. Because only part of the breast is treated, this is considered to be a form of accelerated partial breast irradiation. (Other forms of accelerated partial breast irradiation are described under Brachytherapy.)

Since more research is needed to know if all of the newer methods will have the same long-term results as standard radiation, not all doctors use them. Women who are interested in these approaches may want to ask their doctor about taking part in clinical trials of accelerated breast irradiation going on now.

Possible side effects of external radiation

The main short-term side effects of external beam radiation therapy to the breast are:

- Swelling in the breast
- Skin changes in the treated area similar to a sunburn (redness, skin peeling, darkening of the skin)
- Fatigue
Your health care team may advise you to avoid exposing the treated skin to the sun because it could make the skin changes worse. Most skin changes get better within a few months. Changes to the breast tissue usually go away in 6 to 12 months, but it can take longer.

External beam radiation therapy can also cause side effects later on:

- Some women may find that radiation therapy causes the breast to become smaller and firmer.
- Radiation may affect your options for breast reconstruction later on. It can also raise the risk of problems if it’s given after reconstruction, especially tissue flap procedures.
- Women who have had breast radiation may have problems breastfeeding later on.
- Radiation to the breast can sometimes damage some of the nerves to the arm. This is called **brachial plexopathy** and can lead to numbness, pain, and weakness in the shoulder, arm, and hand.
- Radiation to the underarm lymph nodes can cause lymphedema, a type of pain and swelling in the arm or chest.
- In rare cases, radiation therapy may weaken the ribs, which could lead to a fracture.
- In the past, parts of the lungs and heart were more likely to get some radiation, which could lead to long-term damage of these organs in some women. Modern radiation therapy equipment allows doctors to better focus the radiation beams, so these problems are rare today.
- A very rare complication of radiation to the breast is the development of another cancer called an angiosarcoma.

## Brachytherapy

Brachytherapy, also known as **internal radiation**, is another way to deliver radiation therapy. Instead of aiming radiation beams from outside the body, a device containing radioactive seeds or pellets is placed into the breast tissue for a short time in the area where the cancer had been removed.

For women who had breast-conserving surgery (BCS), brachytherapy can be used along with external beam radiation as a way to add an extra boost of radiation to the tumor site. It may also be used by itself (instead of radiation to the whole breast) as a form of accelerated partial breast irradiation. Tumor size, location, and other factors may limit who can get brachytherapy.
Types of brachytherapy

There are different types of brachytherapy:

- **Interstitial brachytherapy**: In this approach, several small, hollow tubes called catheters are inserted into the breast around the area where the cancer was removed and are left in place for several days. Radioactive pellets are inserted into the catheters for short periods of time each day and then removed. This method of brachytherapy has been around longer (and has more evidence to support it), but it is not used as much anymore.

- **Intracavitary brachytherapy**: This is the most common type of brachytherapy for women with breast cancer. A device is put into the space left from BCS and is left in place until treatment is complete. There are several different devices available (including MammoSite, SAVI, Axxent, and Contura), most of which require surgical training for proper placement. They all go into the breast as a small catheter (tube). The end of the device inside the breast is then expanded so that it stays securely in place for the entire treatment. The other end of the catheter sticks out of the breast. For each treatment, one or more sources of radiation (often pellets) are placed down through the tube and into the device for a short time and then removed. Treatments are typically given twice a day for 5 days as an outpatient. After the last treatment, the device is collapsed down again and removed.

Early studies of intracavitary brachytherapy as the only radiation after BCS have had promising results as far as having at least equal cancer control compared with standard whole breast radiation, but may have more complications including poor cosmetic results. Studies of this treatment are being done and more follow-up is needed.

Early studies of intracavitary brachytherapy as the only radiation after BCS have had promising results, but they didn’t directly compare this technique with standard whole breast external beam radiation.

**Possible side effects of intracavitary brachytherapy**

As with external beam radiation, intracavitary brachytherapy can have side effects, including:

- Redness at the treatment site
- Bruising at the treatment site
- Breast pain
- Infection
• Damage to fatty tissue in the breast
• Weakness and fracture of the ribs in rare cases
• Fluid collecting in the breast (seroma)

References


Chemotherapy for Breast Cancer

Chemotherapy (chemo) is treatment with cancer-killing drugs that may be given intravenously (injected into your vein) or by mouth. The drugs travel through the bloodstream to reach cancer cells in most parts of the body. Occasionally, chemo may be given directly into the spinal fluid which surrounds the brain and spinal cord.

When is chemotherapy used?

Not all women with breast cancer will need chemo, but there are several situations in which chemo may be recommended:

- **After surgery (adjuvant chemotherapy)**: Adjuvant chemo is used to try to kill any cancer cells that might have been left behind or have spread but can't be seen, even on imaging tests. If these cells were allowed to grow, they could form new tumors in other places in the body. Adjuvant chemo can lower the risk of breast cancer coming back.

- **Before surgery (neoadjuvant chemotherapy)**: Neoadjuvant chemo can be used to try to shrink the tumor so it can be removed with less extensive surgery. Because of this, neoadjuvant chemo is often used to treat cancers that are too big to be
removed by surgery at the time of diagnosis (called **locally advanced cancers**). Also, by giving chemo before the tumor is removed, doctors can better see how the cancer responds to it. If the first set of chemo drugs doesn't shrink the tumor, your doctor will know that other drugs are needed. It should also kill any cancer cells that have spread but can't be seen. Just like adjuvant chemo, neoadjuvant chemo can lower the risk of breast cancer coming back.

- **For advanced breast cancer:** Chemo can be used as the main treatment for women whose cancer has spread outside the breast and underarm area, either when it is diagnosed or after initial treatments. The length of treatment depends on how well the chemo is working and how well you tolerate it.

Sometimes it is not clear if chemotherapy will be helpful. There are tests available, such as Oncotype DX and Mammaprint, that can help determine which women will most likely benefit from chemo after breast surgery. See [Breast Cancer Gene Expression Tests](#) for more information.

### Which chemotherapy drugs are used for breast cancer?

In most cases (especially as adjuvant or neoadjuvant treatment), chemo is most effective when combinations of drugs are used. Today, doctors use many different combinations, and it's not clear that any single combination is clearly the best.

#### The most common drugs used for adjuvant and neoadjuvant chemo include:

- Anthracyclines, such as doxorubicin (Adriamycin) and epirubicin (Ellence)
- Taxanes, such as paclitaxel (Taxol) and docetaxel (Taxotere)
- 5-fluorouracil (5-FU)
- Cyclophosphamide (Cytoxan)
- Carboplatin (Paraplatin)

Most often, combinations of 2 or 3 of these drugs are used.

### Chemotherapy for advanced breast cancer

Chemo drugs useful in treating women with breast cancer that has spread include:

- Taxanes, such as paclitaxel (Taxol), docetaxel (Taxotere), and albumin-bound
paclitaxel (Abraxane)
• Anthracyclines (Doxorubicin, pegylated liposomal doxorubicin, and Epirubicin)
• Platinum agents (cisplatin, carboplatin)
• Vinorelbine (Navelbine)
• Capecitabine (Xeloda)
• Gemcitabine (Gemzar)
• Ixabepilone (Ixempra) Albumin-bound paclitaxel (nab-paclitaxel or Abraxane)
• Eribulin (Halaven)

Although drug combinations are often used to treat early breast cancer, advanced breast cancer more often is treated with single chemo drugs. Still, some combinations, such as paclitaxel plus carboplatin, are commonly used to treat advanced breast cancer.

For cancers that are HER2-positive, one or more drugs that target HER2 may be used with chemo. (See Targeted Therapy for Breast Cancer for more information about these drugs.)

How is chemotherapy given?

Chemo drugs for breast cancer are typically given into a vein (IV), either as an injection over a few minutes or as an infusion over a longer period of time. This can be done in a doctor’s office, chemotherapy clinic, or in a hospital setting.

Often, a slightly larger and sturdier IV is required in the vein system to administer chemo. They are known as central venous catheters (CVCs), central venous access devices (CVADs), or central lines. They are used to put medicines, blood products, nutrients, or fluids right into your blood. They can also be used to take out blood for testing.

Many different kinds of CVCs are available. The 2 most common types are the port and the PICC line. For breast cancer patients, the central line is typically placed on the opposite side of the breast that had surgery.

Doctors give chemo in cycles, with each period of treatment followed by a rest period to give you time to recover from the effects of the drugs. Cycles are most often 2 or 3 weeks long. The schedule varies depending on the drugs used. For example, with some drugs, the chemo is given only on the first day of the cycle. With others, it is given for a few days in a row, or once a week. Then, at the end of the cycle, the chemo schedule repeats to start the next cycle.
Adjuvant and neoadjuvant chemo is often given for a total of 3 to 6 months, depending on the drugs used. The length of treatment for advanced breast cancer is based on how well it is working and what side effects you have.

**Dose-dense chemotherapy**

Doctors have found that giving the cycles of certain chemo drugs closer together can lower the chance that the cancer will come back and improve survival for some women. For example, a drug that would normally be given every 3 weeks might be given every 2 weeks. This can be done for both neoadjuvant and adjuvant treatment. It can lead to more problems with low blood cell counts, so it’s not an option for all women.

**Possible side effects of chemo for breast cancer**

Chemo drugs can cause side effects. These depend on the type and dose of drugs given, and the length of treatment. Some of the most common possible side effects include:

- Hair loss
- Nail changes
- Mouth sores
- Loss of appetite or weight changes
- Nausea and vomiting
- Diarrhea

Chemo can also affect the blood-forming cells of the bone marrow, which can lead to:

- Increased chance of infections (from low white blood cell counts)
- Easy bruising or bleeding (from low blood platelet counts)
- Fatigue (from low red blood cell counts and other reasons)

These side effects usually go away after treatment is finished. There are often ways to lessen these side effects. For example, drugs can be given to help prevent or reduce nausea and vomiting.

Other side effects are also possible. Some of these are more common with certain chemo drugs. Ask your cancer care team about the possible side effects of the specific drugs you are getting.

**Menstrual changes and fertility issues**
For younger women, changes in menstrual periods are a common side effect of chemo. Premature menopause (not having any more menstrual periods) and infertility (not being able to become pregnant) may occur and may be permanent. Some chemo drugs are more likely to cause this than others. The older a woman is when she gets chemotherapy, the more likely it is that she will go through menopause or become infertile as a result. When this happens, there is an increased risk of bone loss and osteoporosis. There are medicines that can treat or help prevent problems with bone loss.

Even if your periods have stopped while you are on chemo, you may still be able to get pregnant. Getting pregnant while on chemo could lead to birth defects and interfere with treatment. If you are pre-menopausal before treatment and are sexually active, it's important to discuss using birth control with your doctor. It is not a good idea for women with hormone receptor-positive breast cancer to take hormonal birth control (like birth control pills), so it's important to talk with both your oncologist and your gynecologist (or family doctor) about what options would be best in your case. Women who have finished treatment (like chemo) can safely go on to have children, but it's not safe to get pregnant while on treatment.

If you think you might want to have children after being treated for breast cancer, talk with your doctor before you start treatment. Learn more from our section on fertility concerns for women with cancer.

If you are pregnant when you get breast cancer, you still can be treated. Certain chemo drugs can be taken safely during the last 2 trimesters of pregnancy. We have more details in our section on breast cancer during pregnancy.

**Heart damage**

Doxorubicin, epirubicin, and some other chemo drugs rarely can cause permanent heart damage (called cardiomyopathy). The risk is highest if the drug is used for a long time or in high doses.

Most doctors will check your heart function with a test like an echocardiogram (an ultrasound of the heart) or a MUGA scan before starting one of these drugs. They also carefully control the doses, watch for symptoms of heart problems, and may repeat the heart test during treatment. If the heart function begins to worsen, treatment with these drugs will be temporarily or permanently stopped. Still, in some people, signs of damage might not appear until months or years after treatment stops. Damage from these drugs happens more often if other drugs that can cause heart damage (such as those that target HER2) are used also, so doctors are more cautious when these drugs are used.
Nerve damage (neuropathy)

Many drugs used to treat breast cancer, including the taxanes (docetaxel and paclitaxel), platinum agents (carboplatin, cisplatin), vinorelbine, eribulin, and ixabepilone, can damage nerves outside of the brain and spinal cord. This can sometimes lead to symptoms (mainly in the hands and feet) like numbness, pain, burning or tingling sensations, sensitivity to cold or heat, or weakness. In most cases this goes away once treatment is stopped, but it might last a long time in some women or may become permanent. There are medicines that could help (See Peripheral Neuropathy Caused By Chemotherapy.)

Hand-foot syndrome

Certain chemo drugs, such as capecitabine and liposomal doxorubicin, can irritate the palms of the hands and the soles of the feet. This is called hand-foot syndrome. Early symptoms include numbness, tingling, and redness. If it gets worse, the hands and feet can become swollen and uncomfortable or even painful. The skin may blister, leading to peeling or even open sores. There is no specific treatment, although some creams or steroids given before chemo may help. These symptoms gradually get better when the drug is stopped or the dose is lowered. The best way to prevent severe hand-foot syndrome is to tell your doctor when symptoms first come up, so that the drug dose can be changed or other medicines can be given.

Chemo brain

Many women who are treated for breast cancer report a slight decrease in mental functioning. They may have some problems with concentration and memory, which may last a long time. Although many women have linked this to chemo, it also has been seen in women who did not get chemo as part of their treatment. Still, most women function well after treatment. In studies that have found chemo brain to be a side effect of treatment, the symptoms most often last for a few years. (See Chemo Brain.)

Increased risk of leukemia

Very rarely, certain chemo drugs can cause diseases of the bone marrow, such as myelodysplastic syndromes or even acute myeloid leukemia, a cancer of white blood cells. When this happens it is usually within 10 years after treatment. For most women, the benefits of chemo in helping prevent breast cancer from coming back or in
extending life are far likely to exceed the risk of this rare but serious complication.

**Feeling unwell or tired (fatigue)**

Many women do not feel as healthy after chemo as they did before. There is often a residual feeling of body pain or achiness and a mild loss of physical functioning. These may be very subtle changes that happen slowly over time.

*Fatigue* is another common problem for women who have received chemo. This may last up to several years. It can often be helped, so it’s important to let your doctor or nurse know about it. Exercise, naps, and conserving energy may be recommended. If you have sleep problems, they can be treated. Sometimes women become depressed, which may be helped by counseling and/or medicines.

- **References**


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Hormone Therapy for Breast Cancer

Some types of breast cancer are affected by hormones in the blood. ER-positive and PR-positive breast cancer cells have receptors (proteins) that attach to estrogen, which helps them grow. There are different ways to stop estrogen from attaching to these receptors.

Hormone therapy is a form of systemic therapy, meaning it reaches cancer cells almost anywhere in the body and not just in the breast. It's recommended for women with hormone receptor-positive (ER-positive and/or PR-positive) breast cancers, and it does not help women whose tumors are hormone receptor-negative (both ER- and PR-negative).

When is hormone therapy used?

Hormone therapy is often used after surgery (as adjuvant therapy) to help reduce the risk of the cancer coming back. Sometimes it is started before surgery (as neoadjuvant therapy) as well. It is usually taken for at least 5 years.

Hormone therapy can also be used to treat cancer that has come back after treatment or that has spread to other parts of the body.

How does hormone therapy work?

About 2 out of 3 breast cancers are hormone receptor-positive. Their cells have receptors (proteins) that attach to the hormones estrogen (ER-positive cancers) and/or progesterone (PR-positive cancers). For these cancers, high estrogen levels help the cancer cells grow and spread.

There are several types of hormone therapy, which use different ways to keep estrogen from helping the cancer grow. Most types of hormone therapy for breast cancer either lower estrogen levels or stop estrogen from acting on breast cancer cells.

Drugs that block estrogen receptors

These drugs work by stopping estrogen from stimulating breast cancer cells to grow.
Tamoxifen

This drug blocks estrogen receptors on breast cancer cells. It stops estrogen from connecting to the cancer cells and telling them to grow and divide. While tamoxifen acts like an anti-estrogen in breast cells, it acts like an estrogen in other tissues, like the uterus and the bones. Because of this, it is called a selective estrogen receptor modulator (SERM).

Tamoxifen can be used in several ways:

- For women with hormone receptor-positive breast cancer treated with surgery, tamoxifen can help lower the chances of the cancer coming back and raise the chances of living longer. It can also lower the risk of getting a new cancer in the other breast. Tamoxifen can be started either after surgery (adjuvant therapy) or before surgery (neoadjuvant therapy) and is usually taken for 5 to 10 years. For early-stage breast cancer, this drug is mainly used for women who have not yet gone through menopause. (If you have gone through menopause, aromatase inhibitors are usually used instead.)
- For women who have been treated for ductal carcinoma in situ (DCIS) that is hormone receptor-positive, taking tamoxifen for 5 years lowers the chance of the DCIS coming back. It also lowers the chance of getting an invasive breast cancer.
- For women with hormone-positive breast cancer that has spread to other parts of the body, tamoxifen can often help slow or stop the growth of the cancer, and might even shrink some tumors.
- In women at high risk of breast cancer, tamoxifen can be used to help lower the risk of developing breast cancer.

Toremifene (Fareston) is another SERM that works in a similar way, but it is used less often and is only approved to treat metastatic breast cancer. It is not likely to work if tamoxifen has already been used and has stopped working. These drugs are taken by mouth as a pill. The most common side effects of tamoxifen and toremifene are:

- Hot flashes
- Vaginal dryness or discharge
- Mood swings

Some women with cancer spread to the bones may have a tumor flare with pain and swelling in the muscles and bones. This usually decreases quickly, but in some rare cases a woman may also develop a high calcium level in the blood that is hard to control. If this happens, the treatment may need to be stopped for a time.
Rare, but more serious side effects are also possible:

- If a woman has gone through menopause, these drugs can increase her risk of developing **uterine cancer**. Tell your doctor right away about any unusual vaginal bleeding (a common symptom of both of these cancers). Most uterine bleeding is not from cancer, but this symptom always needs prompt attention.
- **Blood clots** are another uncommon, but serious side effect. They usually form in the legs (called **deep vein thrombosis** or DVT), but sometimes a piece of clot may break off and end up blocking an artery in the lungs (**pulmonary embolism** or PE). Call your doctor or nurse right away if you develop pain, redness, or swelling in your lower leg (calf), shortness of breath, or chest pain, because these can be symptoms of a DVT or PE.
- Rarely, tamoxifen has been associated with **strokes** in post-menopausal women, so tell your doctor if you have severe headaches, confusion, or trouble speaking or moving.

Depending on a woman’s menopausal status, tamoxifen can have different effects on the bones. In pre-menopausal women, tamoxifen can cause some bone thinning, but in post-menopausal women it is often good to strengthen bone. The benefits of taking these drugs outweigh the risks for almost all women with hormone receptor-positive breast cancer.

**Fulvestrant (Faslodex)**

Fulvestrant is a drug that blocks and damages estrogen receptors. This drug is not a SERM – it acts like an anti-estrogen throughout the body. It is also known as a **selective estrogen receptor degrader (SERD)**.

Fulvestrant is used to treat metastatic breast cancer, most often after other hormone drugs (like tamoxifen and often an aromatase inhibitor) have stopped working.

It is given by injections into the buttocks. For the first month, the shots are given 2 weeks apart. After that, they are given once a month. Common short-term side effects can include:

- Hot flashes and/or night sweats
- Headache
- Mild nausea
- Bone pain
- Injection site pain
Because fulvestrant blocks estrogen, in theory it could cause weakened bones (osteoporosis) if taken for a long time. Fulvestrant is currently approved only for use in post-menopausal women. It is sometimes used “off-label” in pre-menopausal women, often combined with a luteinizing-hormone releasing hormone (LHRH) agonist to turn off the ovaries (see the section on Ovarian Ablation below).

**Treatments that lower estrogen levels**

Some hormone treatments work by lowering estrogen levels. Because estrogen encourages hormone receptor-positive breast cancers to grow, lowering the estrogen level can help slow the cancer’s growth or help prevent it from coming back.

**Aromatase inhibitors (AIs)**

Aromatase inhibitors (AIs) are drugs that stop estrogen production. Before menopause, most estrogen is made by the ovaries. But for women whose ovaries aren’t working, either due to menopause or certain treatments, a small amount of estrogen is still made in the fat tissue by an enzyme (called aromatase). AIs work by blocking aromatase from making estrogen.

These drugs are useful in women who are past menopause, although they can also be used in premenopausal women in combination with ovarian suppression (see below).

There are 3 AIs that seem to work about equally well in treating breast cancer:

- Letrozole (Femara)
- Anastrozole (Arimidex)
- Exemestane (Aromasin)

These drugs are pills taken daily.

**Use in adjuvant therapy:** After surgery, taking an AI, either alone or after tamoxifen, has been shown to work better than taking just tamoxifen for 5 years to reduce the risk of the cancer coming back.

Schedules that are known to be helpful include:

- Tamoxifen for 2 to 3 years, followed by an AI to complete 5 years of treatment
- An AI for 2 to 3 years followed by Tamoxifen to complete 5 years of treatment
- Tamoxifen for 5 years, followed by an AI for 5 years
- An AI for 5 years
• Tamoxifen for 5 to 10 years (if you are unable to take an AI)

For most post-menopausal women whose cancers are hormone receptor-positive, most doctors recommend taking an AI at some point during adjuvant therapy. Right now, standard treatment is to take these drugs for about 5 years, or to alternate with tamoxifen for a total of at least 5 years, or to take in sequence with tamoxifen for at least 3 years. Studies are now being done to see if taking an AI for more than 5 years would be more helpful. Tamoxifen is an option for some women who cannot take an AI. Taking tamoxifen for 10 years is considered more effective than taking it for 5 years, but you and your doctor will decide the best schedule of treatment for you.

If you have early-stage breast cancer and had not gone through menopause when you were first diagnosed, your doctor might recommend taking tamoxifen first, and then taking an AI later if you go through menopause during treatment. Another option is taking a drug called a luteinizing hormone-releasing hormone (LHRH) analog, which turns off the ovaries, along with an AI. An AI should not be taken alone for breast cancer treatment in pre-menopausal women because it is unsafe and can increase hormone levels.

Use in cancer that comes back or has spread: AIs can also be used to treat more advanced hormone-positive breast cancers, especially in post-menopausal women. They are often continued for as long as they are helpful.

Possible side effects: The AIs tend to have fewer serious side effects than tamoxifen. They don't cause uterine cancers and very rarely cause blood clots. They can, however, cause muscle pain and joint stiffness and/or pain. The joint pain may be similar to a feeling of having arthritis in many different joints at one time. Switching to a different AI may improve this side effect, but it has led some women to stop treatment. If this happens, most doctors recommend using tamoxifen to complete 5 to 10 years of hormone treatment.

Because AIs drastically lower the estrogen level in women after menopause, they can also cause bone thinning, sometimes leading to osteoporosis and even fractures. If you are taking an AI, your bone density may be tested and you may also be given drugs, such as bisphosphonates or denosumab, to strengthen your bones.

Ovarian suppression

For pre-menopausal women, removing or shutting down the ovaries (ovarian suppression), which are the main source of estrogen, effectively makes them post-menopausal. This may allow some other hormone therapies, such as AIs, to be used.
There are several ways to remove or shut down the ovaries to treat metastatic breast cancer, as well as some women with early-stage disease:

- **Oophorectomy**: Surgery to remove the ovaries. This is a form of permanent ovarian ablation.
- **Luteinizing hormone-releasing hormone (LHRH) analogs**: These drugs are used more often than oophorectomy. They stop the signal that the body sends to the ovaries to make estrogen, which causes temporary menopause. Common LHRH drugs include goserelin (Zoladex) and leuprolide (Lupron). They can be used alone or with other hormone drugs (tamoxifen, aromatase inhibitors, fulvestrant) as hormone therapy in pre-menopausal women.
- **Chemotherapy drugs**: Some chemo drugs can damage the ovaries of pre-menopausal women so they no longer make estrogen. Ovarian function returns months or years later in some women, but in others the damage to the ovaries is permanent and leads to menopause. This side effect can sometimes be a helpful (if unintended) consequence of chemotherapy with regard to breast cancer treatment.

All of these methods can cause symptoms of menopause, including hot flashes, night sweats, vaginal dryness, and mood swings.

### Less common types of hormone therapy

Some other types of hormone therapy that were used more often in the past, but are rarely given now. These include:

- Megestrol acetate (Megace), a progesterone-like drug
- Androgens (male hormones)
- High doses of estrogen

These might be options if other forms of hormone therapy are no longer working, but they can often cause side effects.

### References


Tjan-Heijnen VC, Van Hellemond IE, Peer PG, et al. First results from the multicenter phase III DATA study comparing 3 versus 6 years of anastrozole after 2-3 years of tamoxifen in postmenopausal women with hormone receptor-positive early breast cancer. Presented at: 2016 San Antonio Breast Cancer Symposium; December 6-10; San Antonio, TX. Abstract S1-03.


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Targeted Therapy for Breast Cancer

As researchers have learned more about changes in cancer cells that cause them to grow out of control, they’ve developed new types of drugs that target some of these cell changes. These targeted drugs are designed to block the growth and spread of cancer cells. These drugs work differently from chemotherapy drugs, which attack all cells that are growing quickly (including cancer cells).

Targeted drugs sometimes work even when chemo drugs do not. Some targeted drugs can help other types of treatment work better. Targeted drugs also tend to have different side effects than chemo.

Targeted therapy for HER2-positive breast cancer

For about 1 in 5 women with breast cancer, the cancer cells have too much of a growth-promoting protein known as HER2/neu (or just HER2) on their surface. These cancers, known as HER2-positive breastcancers, tend to grow and spread more aggressively. A number of drugs have been developed that target this protein:

- **Trastuzumab (Herceptin):** This is a monoclonal antibody, which is a man-made version of a very specific immune system protein. It is often given along with chemo, but it might also be used alone (especially if chemo alone has already been tried). Trastuzumab can be used to treat both early- and late-stage breast cancer. When started before or after surgery to treat early breast cancer, this drug is usually given for a total of a year. For advanced breast cancer, treatment is often given for as long as the drug is helpful. This drug is given into a vein (IV).
- **Pertuzumab (Perjeta):** This monoclonal antibody can be given with trastuzumab and chemo, either before surgery to treat early-stage breast cancer, or to treat advanced breast cancer. This drug is given into a vein (IV).
- **Ado-trastuzumab emtansine (Kadcyla, also known as TDM-1):** This is a monoclonal antibody attached to a chemotherapy drug. It is used by itself to treat advanced breast cancer in women who have already been treated with trastuzumab and chemo. This drug is also given in a vein (IV).
- **Lapatinib (Tykerb):** This is a kinase inhibitor. It is a pill taken daily. Lapatinib is used to treat advanced breast cancer, and might be used along with certain chemotherapy drugs, trastuzumab, or hormone therapy drugs.
- **Neratinib (Nerlynx):** This is another kinase inhibitor. It is a pill that is taken daily.
Neratinib is used to treat early-stage breast cancer after a woman has completed one year of trastuzumab and is usually given for one year. Some clinical trials show that it may also be effective in advanced breast cancer, as well.

**Side effects of targeted therapy for HER2-positive breast cancer**

The side effects of these drugs are often mild, but some can be serious. Discuss what you can expect with your doctor.

Some women develop **heart damage** during or after treatment with trastuzumab, pertuzumab, or ado-trastuzumab emtansine. This can lead to **congestive heart failure**. For most (but not all) women, this effect lasts a short time and gets better when the drug is stopped. The risk of heart problems is higher when these drugs are given with certain chemo drugs that also can cause heart damage, such as doxorubicin (Adriamycin) and epirubicin (Ellence). Because these drugs can cause heart damage, doctors often check your heart function (with an echocardiogram or a MUGA scan) before treatment, and again while you are taking the drug. Let your doctor know if you develop symptoms such as **shortness of breath**, **leg swelling**, and **severe fatigue**.

Lapatinib and neratinib can cause **severe diarrhea**, so it’s very important to let your health care team know about any changes in bowel habits as soon as they happen. Lapatinib can also cause **hand-foot syndrome**, in which the hands and feet become sore and red, and may blister and peel. Pertuzumab can also cause diarrhea.

**If you are pregnant, you should not take these drugs.** They can harm and even cause death to the fetus. If you could become pregnant, talk to your doctor about using effective birth control while taking these drugs.

**Targeted therapy for hormone receptor-positive breast cancer**

About 2 of 3 breast cancers are hormone receptor-positive (ER-positive or PR-positive). For women with these cancers, treatment with [hormone therapy](#) is often helpful. Certain targeted therapy drugs can make hormone therapy even more effective, although these targeted drugs might also add to the side effects.

**CDK4/6 inhibitors**

Palbociclib (Ibrance), ribociclib (Kisqali), and abemaciclib (Verzenio) are drugs that
block proteins in the cell called cyclin-dependent kinases (CDKs), particularly CDK4 and CDK6. Blocking these proteins in hormone receptor-positive breast cancer cells helps stop the cells from dividing. This can slow cancer growth.

Palbociclib and ribociclib are approved for women who have gone through menopause and have advanced hormone receptor-positive, HER2-negative breast cancer. They are used along with certain hormone therapy drugs such as fulvestrant or an aromatase inhibitor (such as letrozole). These drugs are taken as pills, typically once a day for 3 weeks at a time, with a week off before starting again.

Abemaciclib is approved for use with fulvestrant in women who have gone through menopause with advanced hormone receptor-positive, HER2-negative breast cancer that has gotten worse after hormone therapy. It can also be given without fulvestrant in women who have previously been treated with hormone therapy and chemotherapy. Abemaciclib is taken as pills, typically twice a day.

Side effects of these drugs tend to be mild. The most common side effects are low blood cell counts and fatigue. Nausea and vomiting, mouth sores, hair loss, diarrhea, and headache are less common side effects. Very low white blood cell counts can increase the risk of serious infection.

Everolimus (Afinitor)

Everolimus is used for women who have gone through menopause and have advanced hormone receptor-positive, HER2-negative breast cancer. It is used along with the aromatase inhibitor exemestane (Aromasin) for women whose cancers have grown while being treated with either letrozole or anastrozole (or if the cancer started growing shortly after treatment with these drugs was stopped).

This targeted therapy drug blocks mTOR, a protein in cells that normally helps them grow and divide. Everolimus may also stop tumors from developing new blood vessels, which can help limit their growth. In treating breast cancer, this drug seems to help hormone therapy drugs work better. Everolimus is a pill that is taken once a day.

Common side effects of everolimus include mouth sores, diarrhea, nausea, feeling weak or tired, low blood counts, shortness of breath, and cough. Everolimus can also increase blood lipids (cholesterol and triglycerides) and blood sugars, so your doctor will check your blood work periodically while you are taking this drug. It can also increase your risk of serious infections, so your doctor will watch you closely for infection.

Everolimus is also being studied for use in earlier-stage breast cancer, with other
hormone therapy drugs, and in combination with other treatments.

**References**


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Treatment of Breast Cancer by Stage

The stage (extent) of your breast cancer is an important factor in making decisions about your treatment options. In general, the more the breast cancer has spread, the more treatment you will likely need. But other factors can also be important, such as:

- If the cancer cells contain hormone receptors (that is, if the cancer is ER-positive or PR-positive)
- If the cancer cells have large amounts of the HER2 protein (that is, if the cancer is HER2-positive)
- Your overall health and personal preferences
- If you have gone through menopause or not
- How fast the cancer is growing (measured by grade or other measures)

Talk with your doctor about how these factors can affect your treatment options.

Stage 0

Stage 0 cancer means that the cancer is limited to the inside of the milk duct and is a non-invasive cancer. The treatment approaches for these non-invasive breast tumors are often different from the treatment of invasive breast cancer. Stage 0 breast tumors include ductal carcinoma in situ (DCIS).

Lobular carcinoma in situ (LCIS) used to be categorized as Stage 0 but this has been changed, because it is not cancer, but does indicate a higher risk of breast cancer. Look for more information about LCIS in Non-cancerous Breast Conditions.

Stages I to III

Treatment for stages I to III breast cancer usually includes surgery and radiation therapy, often along with chemo or other drug therapies either before or after surgery.

Stage I: These breast cancers are still relatively small and either have not spread to the lymph nodes or have only a tiny area of cancer spread in the sentinel lymph node (the first lymph node to which cancer is likely to spread).

Stage II: These breast cancers are larger than stage I cancers and/or have spread to a few nearby lymph nodes.
**Stage III**: These tumors are larger or are growing into nearby tissues (the skin over the breast or the muscle underneath), or they have spread to many nearby lymph nodes.

**Stage IV (metastatic breast cancer)**

Stage IV cancers have spread beyond the breast and nearby lymph nodes to other parts of the body. Treatment for stage IV breast cancer is usually a systemic (drug) therapy.

**Inflammatory breast cancer**

Inflammatory breast cancer (IBC) can be either stage III or stage IV, depending on whether it has spread to other parts of the body. Treatment for IBC can include chemo or other systemic therapies, local therapies such as radiation, and surgery.

**Recurrent breast cancer**

Cancer is called recurrent when it comes back after treatment. Recurrence can be local (in the same breast or in the surgery scar), regional (in nearby lymph nodes), or in a distant area. Treatment for recurrent breast cancer depends on where the cancer recurs and what treatments you’ve had before.

**Triple-negative breast cancer**

Triple-negative breast cancer cells don’t have estrogen or progesterone receptors and also don’t have too much of the protein called HER2. Triple-negative breast cancers grow and spread faster than most other types of breast cancer. Because the cancer cells don’t have hormone receptors, hormone therapy is not helpful in treating these cancers. And because they don’t have much HER2, drugs that target HER2 aren’t helpful, either. Chemotherapy is usually the standard treatment.

Because there are not many current treatments for this type of breast cancer, if you are in otherwise good health, you might want to think about taking part in a clinical trial testing a newer treatment.

- **References**
Morrow M, Burstein HJ, Harris JR. Chapter 79: Malignant Tumors of the Breast. In: DeVita VT, Lawrence TS, Rosenberg SA, eds. *DeVita, Hellman, and*
Treatment of Lobular Carcinoma in Situ (LCIS)

Lobular carcinoma in situ (LCIS) means abnormal cells are in the lobules of the breast. LCIS is sometimes grouped with ductal carcinoma in situ (DCIS) as a type of non-invasive breast cancer, but LCIS is different from DCIS and is not cancer. It is a benign (noncancerous) condition that puts you at risk to develop invasive cancer.

Does LCIS need to be treated?

Having LCIS does increase your risk of developing invasive breast cancer later on. But since LCIS is not a true cancer or pre-cancer, often no treatment is recommended. Sometimes if a needle biopsy result shows LCIS, the doctor might recommend that it be removed completely (with an excisional biopsy or some other type of breast-conserving surgery) to help make sure that LCIS was the only thing there. This is especially true if the LCIS is described as pleomorphic or if it has necrosis (areas of dead cells), in which case it might be more likely to grow quickly.

With LCIS, close follow-up is very important. This usually includes a yearly mammogram and a breast exam. Close follow-up of both breasts is important because women with LCIS in one breast have the same increased risk of developing cancer in
both breasts. There isn’t enough evidence to recommend getting routine magnetic resonance imaging (MRI) in addition to mammograms for all women with LCIS, but it’s reasonable for women with LCIS to talk with their doctors about their other risk factors and the benefits and limits of being screened yearly with MRI.

Most of the time, LCIS is only a risk factor for developing breast cancer, except in a certain kind of LCIS, called pleomorphic LCIS. This type may be more likely to turn into invasive cancer than most types of LCIS. Some doctors feel that this kind of LCIS needs to be removed completely with surgery.

Newer evidence is suggesting LCIS may be more of a pre-cancer than we thought. More research is being done.

**Can you lower your risk of invasive breast cancer?**

If you have LCIS, you may want to consider taking a hormone medicine such as tamoxifen, raloxifene, or aromatase inhibitors to help reduce your risk of breast cancer. You might also want to consider taking part in a clinical trial for breast cancer prevention, or discussing other possible prevention strategies (such as getting to a healthy weight or starting an exercise program) with your doctor.

Because LCIS is linked to an increased risk of cancer in both breasts, some women with LCIS choose to have a bilateral simple mastectomy (removal of both breasts but not nearby lymph nodes) to lower this risk. This is more likely to be a reasonable option in women who also have other risk factors for breast cancer, such as a BRCA gene mutation or a strong family history. This may be followed by delayed breast reconstruction.

**Treatment of Ductal Carcinoma in Situ (DCIS)**

Ductal carcinoma in situ (DCIS) means the cells that line the milk ducts of the breast have become cancer, but they have not spread into surrounding breast tissue.

DCIS is considered non-invasive or pre-invasive breast cancer. DCIS can’t spread outside the breast, but it still needs to be treated because it can sometimes go on to become invasive breast cancer (which can spread).
In most cases, a woman with DCIS can choose between breast-conserving surgery (BCS) and simple mastectomy. But sometimes a mastectomy might be a better option.

**Breast-conserving surgery (BCS)**

In breast-conserving surgery (BCS), the surgeon removes the tumor and a small amount of normal breast tissue around it. Lymph node removal is not always needed with BCS, but it may be done if the doctor thinks the area of DCIS might also contain invasive cancer. The chances an area of DCIS contains invasive cancer goes up with tumor size and how fast the cancer is growing. If lymph nodes are removed, this is usually done as a sentinel lymph node biopsy (SLNB).

If BCS is done, it is usually followed by radiation therapy. This lowers the chance of the cancer coming back in the same breast (either as more DCIS or as an invasive cancer). BCS without radiation therapy is not a standard treatment, but it might be an option for certain women who had small areas of low-grade DCIS that were removed with large enough cancer-free surgical margins.

**Mastectomy**

Simple mastectomy (removal of the entire breast) may be needed if the area of DCIS is very large, if the breast has several areas of DCIS, or if BCS cannot remove the DCIS completely (that is, the BCS specimen and re-excision specimens still have cancer cells in or near the surgical margins). Many doctors will do a SLNB along with the mastectomy. This is because if an area of invasive cancer is found in the tissue removed during a mastectomy, the doctor won’t be able to go back and do the SLNB later, and so may have to do a full axillary lymph node dissection (ALND).

Women having a mastectomy for DCIS may choose to have breast reconstruction immediately or later.

**Hormone therapy after surgery**

If the DCIS is hormone receptor-positive (ER-positive or PR-positive), adjuvant treatment with tamoxifen (for any woman) or an aromatase inhibitor (for women past menopause) for 5 years after surgery can lower the risk of another DCIS or invasive cancer developing in either breast. If you have hormone receptor-positive DCIS, discuss the pros and cons of hormone therapy with your doctors.
Treatment of Breast Cancer Stages I-III

The stage (extent) of your breast cancer is an important factor in making decisions about your treatment.

Most women with breast cancer in stages I, II, or III are treated with surgery, often followed by radiation therapy. Many women also get some kind of drug therapy. In general, the more the breast cancer has spread, the more treatment you will likely need. But your treatment options are affected by your personal preferences and other information about your breast cancer, such as:

- If the cancer cells contain hormone receptors (that is, if the cancer is ER-positive or PR-positive)
- If the cancer cells have large amounts of the HER2 protein (that is, if the cancer is HER2-positive)
- How fast the cancer is growing (measure by grade or Ki-67)
- Your overall health
- If you have gone through menopause or not

Talk with your doctor about how these factors can affect your treatment options.

What type of drug treatment(s) might I get?

Most women with breast cancer in stages I to III will get some kind of drug therapy as part of their treatment. This may include:

- Chemotherapy
- Hormone therapy (tamoxifen, an aromatase inhibitor, or one followed by the other)
- HER2 targeted drugs, such as trastuzumab (Herceptin) and pertuzumab (Perjeta)
- Some combination of these

The types of drugs that might work best depend on the tumor’s hormone receptor status, HER2 status, and other factors.

Treating stage I breast cancer

These breast cancers are still relatively small and either have not spread to the lymph nodes or have spread to only a tiny area in the sentinel lymph node (the first lymph node to which cancer is likely to spread).
Surgery

**Surgery is the main treatment for stage I breast cancer.** These cancers can be treated with either breast-conserving surgery (BCS; sometimes called lumpectomy or partial mastectomy) or mastectomy. The nearby lymph nodes will also need to be checked, either with a sentinel lymph node biopsy (SLNB) or an axillary lymph node dissection (ALND).

In some cases, breast reconstruction can be done at the same time as the surgery to remove the cancer. But if you will need radiation therapy after surgery, it is better to wait to get reconstruction until after the radiation is complete.

Radiation therapy

If BCS is done, radiation therapy is usually given after surgery to lower the chance of the cancer coming back in the breast. Women who are at least 70 years old may consider BCS without radiation therapy if ALL of the following are true:

- The tumor was 2 cm (a little less than 1 inch) or less across and it has been removed completely.
- None of the lymph nodes removed contained cancer.
- The cancer is ER-positive or PR-positive, and hormone therapy is given.

Radiation after BCS still lowers the chance of the cancer coming back in women who meet these criteria, but it has not been shown to help them live longer.

Some women who do not meet these criteria may be tempted to avoid radiation, but studies have shown that not getting radiation increases the chances of the cancer coming back and can shorten their lives.

If mastectomy is done, radiation therapy is less likely to be needed, but it might be given depending on the details of your specific cancer. You should discuss if you need radiation treatment with your doctor. They may send you to a doctor who specializes in radiation, called a radiation oncologist, for evaluation.

Adjuvant systemic therapy (chemo and other drugs)

For women who have a hormone receptor-positive (ER-positive or PR-positive) breast cancer, most doctors will recommend hormone therapy (tamoxifen or an aromatase inhibitor, or one followed by the other) as an adjuvant (additional) treatment, no matter how small the tumor is. Women with tumors larger than 0.5 cm (about ¼ inch) across
may be more likely to benefit from it. Hormone therapy is typically given for at least 5 years.

If the tumor is larger than 1 cm (about ½ inch) across, adjuvant chemotherapy (chemo) is sometimes recommended. Some doctors may suggest chemo for smaller tumors as well, especially if they have any unfavorable features (a cancer that is growing fast; hormone receptor-negative, HER2-positive; or having a high score on a gene panel such as Oncotype Dx).

For HER2-positive cancers, a year of adjuvant trastuzumab (Herceptin) is usually recommended as well.

**Treating stage II breast cancer**

These breast cancers are larger than stage I cancers and/or have spread to a few nearby lymph nodes.

**Local therapy (surgery and radiation therapy)**

Stage II cancers are treated with either breast-conserving surgery (BCS; sometimes called lumpectomy or partial mastectomy) or mastectomy. The nearby lymph nodes will also need to be checked, either with a sentinel lymph node biopsy (SLNB) or an axillary lymph node dissection (ALND).

Women who have BCS are treated with radiation therapy after surgery. Women who have a mastectomy are typically treated with radiation if the cancer is found in the lymph nodes. Some patients who have a SLNB that shows cancer in a few lymph nodes may not have the rest of their lymph nodes removed (ALND) to check for more cancer. In these patients, radiation may be discussed as a treatment option after mastectomy.

If you were initially diagnosed with stage II breast cancer and were given treatment such as chemotherapy or hormone therapy before surgery, radiation therapy might be recommended if cancer is found in the lymph nodes at the time of the mastectomy. A doctor who specializes in radiation, called a radiation oncologist, may review your case to discuss whether radiation would be helpful to you.

If chemotherapy is also needed after surgery, the radiation is delayed until the chemo is done.

In some cases, breast reconstruction can be done during the surgery to remove the
cancer. But if you will need radiation after surgery, it is better to wait to get reconstruction until after the radiation is complete.

**Neoadjuvant and adjuvant systemic therapy (chemo and other drugs)**

Systemic therapy is recommended for women with stage II breast cancer. Some systemic therapies are given before surgery (neoadjuvant therapy), and others are given after surgery (adjuvant therapy). Neoadjuvant treatments are often a good option for women with large tumors, because they can shrink the tumor before surgery, possibly enough to make BCS an option. But this doesn’t improve survival more than getting these treatments after surgery. In some cases, systemic therapy will be started before surgery and then continued after surgery.

The drugs used will depend on the woman’s age and the tumor’s hormone-receptor status and HER2 status. They may include:

- **Chemotherapy:** Chemo can be given before or after surgery.
- **HER2 targeted drugs:** If the cancer is HER2-positive, HER2 targeted drugs are started along with chemo. Both trastuzumab (Herceptin) and pertuzumab (Perjeta) may be used as a part of neoadjuvant treatment. Then trastuzumab is continued after surgery for a total of one year of treatment.
- **Hormone therapy:** If the cancer is hormone receptor-positive, hormone therapy (tamoxifen, an aromatase inhibitor, or one followed by the other) is typically used. It can be started before surgery, but because it continues for at least 5 years, it needs to be given after surgery as well.

**Treating stage III breast cancer**

In stage III breast cancer, the tumor is large (more than 5 cm or about 2 inches across) or growing into nearby tissues (the skin over the breast or the muscle underneath), or the cancer has spread to many nearby lymph nodes.

**If you have inflammatory breast cancer:** Stage III cancers also include some inflammatory breast cancers that have not spread beyond nearby lymph nodes. Treatment of these cancers can be slightly different from the treatment of other stage III breast cancers. You can find more details in our section about treatment for inflammatory breast cancer.

There are two main approaches to treating stage III breast cancer:
Starting with neoadjuvant therapy

Most often, these cancers are treated with neoadjuvant chemotherapy (before surgery). For HER2-positive tumors, the targeted drug trastuzumab (Herceptin) is given as well, sometimes along with pertuzumab (Perjeta). This may shrink the tumor enough to allow a woman to have breast-conserving surgery (BCS). If the tumor doesn’t shrink enough, a mastectomy is done. Nearby lymph nodes will also need to be checked. A sentinel lymph node biopsy (SLNB) is often not an option for stage III cancers, so an axillary lymph node dissection (ALND) is usually done.

Often, radiation therapy is needed after surgery. If breast reconstruction is done, it is usually delayed until after radiation is complete. In some cases, additional (adjuvant) chemo is given after surgery as well. Women with HER2-positive cancers receive trastuzumab after surgery to complete a year of treatment with this drug. Women with hormone receptor-positive (ER-positive or PR-positive) breast cancers will also get adjuvant hormone therapy which can typically be taken at the same time as trastuzumab.

Starting with surgery

Another option for stage III cancers is treatment with surgery first. Because these tumors are fairly large and/or have grown into nearby tissues, this usually means getting a mastectomy. For women with fairly large breasts, BCS may be an option if the cancer hasn’t grown into nearby tissues. SLNB may be an option for some patients, but most will need an ALND. Surgery is usually followed by adjuvant chemotherapy, and/or hormone therapy, and/or trastuzumab. Radiation is recommended after surgery.

Online tools to help make decisions

To help decide if adjuvant therapy is right for you, you might want to visit the Mayo Clinic website at www.mayoclinic.com and type "adjuvant therapy for breast cancer" into the search box. You will find a page that will help you to understand the possible benefits and limits of adjuvant therapy.

Other online guides, such as www.adjuvantonline.com, are designed to be used by health care professionals. This website provides information about your risk of the cancer returning within the next 10 years and what benefits you might expect from hormone therapy and/or chemotherapy. You may want to ask your doctor if he or she uses this site.
Treatment of Stage IV (Metastatic) Breast Cancer

Most women with stage IV breast cancer are treated with systemic therapy. This may include hormone therapy, chemotherapy, targeted therapy, or some combination of these. Local treatments such as surgery or radiation might also be used to help prevent or treat symptoms.

Stage IV cancers have spread beyond the breast and nearby lymph nodes to other parts of the body. When breast cancer spreads, it most commonly goes to the bones, liver, and lungs. It may also spread to the brain or other organs.

Treatment options for stage IV breast cancer

For women with stage IV breast cancer, systemic (drug) therapies are the main treatments. These may include:

- **Hormone therapy**
- **Chemotherapy** (chemo)
- **Targeted drugs**, such as trastuzumab (Herceptin) and pertuzumab (Perjeta)
- Some combination of these

*Surgery* and/or *radiation therapy* may be useful in certain situations (see below).

Treatment can often shrink tumors (or slow their growth), improve symptoms, and help women live longer. These cancers are considered incurable.

Systemic (drug) treatments for stage IV breast cancer

The types of drugs used for stage IV breast cancer depend on the hormone receptor status and the HER2 status of the cancer:

- **Hormone receptor-positive cancers**: Women with hormone receptor-positive (ER-positive or PR-positive) cancers are often treated first with hormone therapy (tamoxifen or an aromatase inhibitor). This may be combined with a targeted drug such as palbociclib (Ibrance), ribociclib (Kisqali), or everolimus (Afinitor). Women who haven’t yet gone through menopause are often treated first with tamoxifen. Because hormone therapy can take months to work, chemo is often the first
treatment for patients with serious problems from their cancer spread, such as breathing problems.

- **Hormone receptor-negative cancers**: Chemo is the main treatment for women with hormone receptor-negative (ER-negative and PR-negative) cancers, because hormone therapy isn’t helpful for these cancers.

- **HER2-positive cancers**: Trastuzumab (Herceptin) may help women with HER2-positive cancers live longer if it’s given along with chemo or with other medications such as hormonal therapy or other anti-HER2 drugs. Pertuzumab (Perjeta), another targeted drug, might be added as well. Another option is the targeted drug ado-trastuzumab emtansine (Kadcyla), which is given alone or with lapatinib.

Treatment often continues until the cancer starts growing again or until side effects become unacceptable. If this happens, other drugs might be tried.

### Local or regional treatments for stage IV breast cancer

Although systemic drugs are the main treatment for stage IV breast cancer, local and regional treatments such as surgery, radiation therapy, or regional chemotherapy are sometimes used as well. These can help treat breast cancer in a specific part of the body, but they are very unlikely to get rid of all of the cancer. These treatments are more likely to be used to help prevent or treat symptoms or complications from the cancer.

Radiation therapy and/or surgery may also be used in certain situations, such as:

- When the breast tumor is causing an open wound in the breast (or chest)
- To treat a small number of metastases in a certain area, such as the brain
- To help prevent bone fractures
- When an area of cancer spread is pressing on the spinal cord
- To treat a blood vessel blockage in the liver
- To provide relief of pain or other symptoms

In some cases, regional chemo (where drugs are delivered directly into a certain area, such as into the fluid around the brain and spinal cord) may be useful as well.

If your doctor recommends such local or regional treatments, it is important that you understand their goal—whether it is to try to cure the cancer or to prevent or treat symptoms.

### Relieving symptoms of advanced breast cancer
Treatment to relieve symptoms depends on where the cancer has spread. For example, pain from bone metastases may be treated with radiation therapy, drugs called bisphosphonates such as pamidronate (Aredia) or zoledronic acid (Zometa), or the drug denosumab (Xgeva). For more, see our information about the treatment of bone metastases.

Advanced cancer that progresses during treatment

Treatment for advanced breast cancer can often shrink the cancer or slow its growth (sometimes for many years), but after a time, it tends to stop working. Further treatment options at this point depend on several factors, including previous treatments, where the cancer is located, and a woman's age, general health, and desire to continue getting treatment.

Progression while on hormone therapy

For hormone receptor-positive (ER-positive or PR-positive) cancers that were being treated with hormone therapy, switching to another type of hormone therapy sometimes helps. For example, if either letrozole (Femara) or anastrozole (Arimidex) were given, using exemestane, possibly with everolimus (Afinitor), may be an option. Another option might be using fulvestrant (Faslodex), along with a CDK inhibitor such as palbociclib (Ibrance) or abemaciclib (Verzenio). If the cancer is no longer responding to any hormone drugs, chemotherapy is usually the next step.

Progression while on chemotherapy

If the cancer is no longer responding to one chemo regimen, trying another may be helpful. Many different drugs and combinations can be used to treat breast cancer. However, each time a cancer progresses during treatment, it becomes less likely that further treatment will have an effect.

Progression while getting HER2 drugs

HER2-positive cancers that no longer respond to trastuzumab (Herceptin) might respond to lapatinib (Tykerb), another drug that attacks the HER2 protein. This drug is often given along with the chemo drug capecitabine (Xeloda), but it can be used with other chemo drugs, with trastuzumab, or even alone (without chemo). Other options for women with HER2-positive cancers include pertuzumab (Perjeta) with chemo and trastuzumab, or ado-trastuzumab emtansine (Kadcyla).
Because current treatments are very unlikely to cure metastatic breast cancer, if you are in otherwise good health, you may want to think about taking part in a clinical trial testing a newer treatment.

**Treatment of Inflammatory Breast Cancer**

Inflammatory breast cancer (IBC) is an uncommon type of invasive breast cancer that typically makes the skin on the breast look red and feel warm. It also may give the breast skin a thick, pitted appearance that looks a lot like an orange peel. These changes are caused by cancer cells blocking lymph vessels in the skin.

Because inflammatory breast cancer has reached these vessels and has caused changes in the skin, it is considered to be at least a stage III breast cancer. IBC that has spread to other parts of the body is considered stage IV. These cancers typically grow quickly and can be challenging to treat.

**Treating stage III inflammatory breast cancer**

IBC that has not spread outside the breast or nearby lymph nodes is stage IIIB or IIIC. Treatment usually starts with chemotherapy (chemo) to try to shrink the tumor. If the cancer is HER2-positive, targeted therapy is given along with the chemo. This is typically followed by surgery (mastectomy) to remove the cancer. Radiation therapy often follows surgery. In some cases, more chemo may be given after surgery but before radiation. If the cancer is hormone receptor-positive (ER- or PR-positive), hormone therapy is given as well. Combining these treatments has improved survival significantly over the years.

**Chemotherapy (possibly along with targeted therapy)**

Chemo drugs enter the bloodstream and circulate throughout the body to reach and destroy cancer cells wherever they are, so chemo is considered a type of systemic therapy. It treats both the main tumor as well as any cancer cells that have broken off and spread to lymph nodes or other parts of the body.

Using chemo before surgery is called *neoadjuvant or preoperative* treatment. Most women with IBC will receive two types of chemo drugs (although not necessarily at the same time):
• An anthracycline, such as doxorubicin (Adriamycin) or epirubicin (Ellence)
• A taxane, such as paclitaxel (Taxol) or docetaxel (Taxotere)
Other chemo drugs may be used as well.

If the cancer is HER2-positive (the cancer cells make too much of a protein called HER2), the targeted therapy drug trastuzumab (Herceptin) is usually given, sometimes along with another targeted drug, pertuzumab (Perjeta). These drugs can lead to heart problems when given with an anthracycline, so one option is to give the anthracycline first (without trastuzumab or pertuzumab), followed by treatment with a taxane and trastuzumab (with or without pertuzumab).

Surgery and further treatments

If the cancer improves with chemo, surgery is typically the next step. The standard operation is a modified radical mastectomy, where the entire breast and the lymph nodes under the arm are removed. Because IBC affects so much of the breast and skin, breast-conserving surgery (partial mastectomy or lumpectomy) and skin-sparing mastectomy are not options. It isn’t clear that sentinel lymph node biopsy (where only one or a few nodes are removed) is reliable in IBC, so it is also not an option.

If the cancer does not respond to chemo (and the breast is still very swollen and red), surgery cannot be done. Either other chemo drugs will be tried, or the breast may be treated with radiation. Then if the cancer responds (the breast shrinks and is no longer red), surgery may be an option.

If breast radiation isn’t given before surgery, it is given after surgery, even if no cancer is thought to remain. This is called adjuvant radiation. It lowers the chance that the cancer will come back. Radiation is usually given 5 days a week for 6 weeks, but in some cases a more intense treatment (twice a day) can be used instead. Depending on how much tumor was found in the breast after surgery, radiation might be delayed until further chemo is given. If breast reconstruction is to be done, it is usually delayed until after the radiation therapy that most often follows surgery.

Treatment after surgery and radiation often includes additional systemic treatment. This is known as adjuvant therapy and can include chemo, hormone therapy (tamoxifen or an aromatase inhibitor) if the cancer cells contain hormone receptors, and/or trastuzumab if the cancer is HER2-positive.

Treating stage IV inflammatory breast cancer
Patients with metastatic (stage IV) IBC are treated with systemic therapy. This may include:

- Chemotherapy
- Hormonal therapy (if the cancer is hormone receptor-positive)
- Targeted therapy with a drug that targets HER2 (if the cancer is HER2-positive)

One or more of these treatments might be used. Surgery and radiation may also be options in certain situations. For more on the treatment of stage IV cancers, see our page about treating stage IV breast cancer.

Regardless of the stage of the cancer, participation in a clinical trial of new treatments for IBC is also a good option because IBC is rare, and these studies often allow access to drugs not available for standard treatment. More information about clinical trials can be found in our clinical trials section.

**Treatment of Recurrent Breast Cancer**

For some women, breast cancer may come back after treatment—sometimes years later. This is called a recurrence. **Recurrence can be local (in the same breast or in the surgery scar), regional (in nearby lymph nodes), or in a distant area.** Cancer that is found in the opposite breast without any cancer elsewhere in the body is not a recurrence—it is a new cancer that requires its own treatment.

**Treating local recurrence**

For women whose breast cancer has recurred locally, treatment depends on their initial treatment.

- If you had breast-conserving surgery (lumpectomy), a local recurrence in the breast is usually treated with mastectomy.
- If the initial treatment was mastectomy, recurrence near the mastectomy site is treated by removing the tumor whenever possible. This is often followed by radiation therapy.

In either case, hormone therapy, targeted therapy (like trastuzumab), chemotherapy, or some combination of these may be used after surgery and/or radiation therapy.

**Treating regional recurrence**
When breast cancer comes back in nearby lymph nodes (such as those under the arm or around the collar bone), it is treated by removing those lymph nodes, if possible. This may be followed by radiation aimed at the area. Systemic treatment (such as chemo, targeted therapy, or hormone therapy) may be considered after surgery as well.

**Treating distant recurrence**

In general, women whose breast cancer comes back in other parts of the body, such as the bones, lungs, or brain, are treated the same way as those found to have stage IV breast cancer in these organs when they were first diagnosed (see Treating Stage IV (Metastatic) Breast Cancer). The only difference is that treatment may be affected by previous treatments a woman has had.

Recurrent breast cancer can sometimes be hard to treat. If you are in otherwise good health, you may want to think about taking part in a clinical trial testing a newer treatment.

Should your cancer come back, see our section about *cancer recurrence* with more general information on how to manage and cope with this phase of your treatment.

**Treating Breast Cancer During Pregnancy**

If you are diagnosed with breast cancer while pregnant, your treatment options will be more complicated because you will want to get the best treatment for your cancer while also protecting the baby. The type and timing of treatment will need to be planned carefully and coordinated between your cancer care team and your obstetrician.

The goal when treating a pregnant woman with breast cancer is the same as when treating a non-pregnant woman: to cure the cancer whenever possible, or to control it and keep it from spreading if it can’t be cured. But the extra concern of protecting a growing fetus may make treatment more complicated.

**Is it safe to treat breast cancer during pregnancy?**
If you are pregnant and have breast cancer, you may have hard choices to make, so be sure you know all your options and get expert help. Pregnant women can safely get treatment for breast cancer, although the types of treatment used and the timing of treatment might be affected by the pregnancy. If you are pregnant and have been diagnosed with breast cancer, your treatment recommendations will depend on:

- The size of the tumor
- Where the tumor is located
- If the cancer has spread and if so, how far
- How far along you are in the pregnancy
- Your overall health
- Your personal preferences

Surgery for breast cancer is generally safe while you’re pregnant. Chemotherapy seems to be safe for the baby if given in the second or third trimester of pregnancy, but it isn’t safe in the first trimester. Other breast cancer treatments, such as hormone therapy, targeted therapy, and radiation therapy, are more likely to harm the baby and are not usually given during pregnancy.

Treatment choices can become complicated if there is a conflict between the best known treatment for the mother and the well-being of the baby. For example, if a woman is found to have breast cancer early in her pregnancy and needs chemotherapy right away, she may be advised to think about ending the pregnancy. A counselor or psychologist should also be part of your health care team to help give you the emotional support you may need.

Some older studies found that ending a pregnancy in order to have cancer treatment didn’t improve a woman’s prognosis (outlook). Even though there were flaws in these studies, ending the pregnancy is no longer routinely recommended when breast cancer is found. Still, this option may be discussed when looking at all the treatment choices available, especially for aggressive cancers that may need treatment right away, such as inflammatory breast cancer.

**Breast cancer surgery during pregnancy**

Surgery to remove the cancer in the breast and nearby lymph nodes is a major part of treatment for any woman with early breast cancer, and generally is safe in pregnancy.

Options for breast cancer surgery might include:

- Removing the entire breast (mastectomy)
- Removing just the part containing the cancer (lumpectomy or breast-conserving surgery [BCS])

Mastectomy is used more often for pregnant women with breast cancer because most women who have BCS need radiation therapy afterward. If radiation is given during pregnancy, it could affect the baby, so it can’t be given until after delivery. But delaying radiation too long could increase the chance of the cancer coming back.

If the cancer is found in the third trimester, BCS might be an option because there might be little or no delay in radiation treatments, especially if chemotherapy is planned after surgery. (Radiation is normally given after chemotherapy treatments are complete.) But if the cancer is found early in the pregnancy, it may mean a longer delay in starting radiation. For women in this situation, mastectomy is likely a better option than BCS followed by radiation.

**Checking lymph nodes for cancer spread**

In addition to removing the tumor in the breast, one or more lymph nodes in the armpit (axillary lymph nodes) also need to be removed to check for cancer spread. One way to do this is an axillary lymph node dissection (ALND). This removes many of the lymph nodes under the arm. Another procedure, called a sentinel lymph node biopsy (SLNB), might be an option depending on how far along you are in pregnancy and your cancer stage. This procedure uses slightly radioactive tracers and a blue dye to pinpoint the nodes most likely to contain cancer cells. SLNB allows the doctor to remove fewer nodes. But there are concerns about the effects the SLNB dye might have on the baby. Because of these concerns, some experts recommend that SLNB be used only later in pregnancy, and that the blue dye not be used during the procedure.

**Is anesthesia safe during pregnancy?**

Surgery for breast cancer generally carries little risk to the baby. But there are certain times in pregnancy when anesthesia (the drugs used to make you sleep for surgery) may be riskier for the baby.

Your surgeon and anesthesiologist, along with a high-risk obstetrician, will need to work together to decide the best time during pregnancy to do the operation. If the surgery is done later in the pregnancy, your obstetrician may be there just in case there are any problems with the baby during surgery. Together, your doctors will decide which anesthesia drugs and techniques are the safest for both you and the baby.

**Treatment after surgery**
Depending on the cancer’s stage, you may need more treatment such as chemotherapy, radiation therapy, hormone therapy, and/or targeted therapy after surgery to help lower the risk of the cancer coming back. This is called adjuvant treatment. In some cases, this treatment can be put off until after delivery.

**Chemotherapy**

Chemotherapy (chemo) may be used after surgery (as adjuvant treatment) for some earlier stages of breast cancer. It also may be used by itself for more advanced cancers.

Chemo is not given during the first 3 months (first trimester) of pregnancy. Because most of the baby’s internal organs develop during this time, the safety of chemo hasn’t been studied in the first trimester. The risk of miscarriage (losing the baby) is also the greatest during this time.

For many years, it was thought that all chemo would harm an unborn baby no matter when it was given. But studies have shown that certain chemo drugs used during the second and third trimesters (months 4 through 9 of pregnancy) don’t raise the risk of birth defects, stillbirths, or health problems shortly after birth, though they may increase the risk of early delivery. Researchers still don’t know if these children will have any long-term effects.

If you have early breast cancer and you need chemo after surgery (adjuvant chemo), it will usually be delayed until at least your second trimester. If you are already in the third trimester when the cancer is found, the chemo may be delayed until after birth. The birth may be induced (brought on) a few weeks early in some cases. These same treatment plans may also be used for women with more advanced cancer.

Chemo is generally not recommended after 35 weeks of pregnancy or within 3 weeks of delivery because it can lower the mother’s blood cell counts. This could cause bleeding and increase the chances of infection during birth. Holding off on chemo for the last few weeks before delivery allows the mother’s blood counts to return to normal before childbirth.

**Treatments that typically must wait until after delivery**

Some treatments for breast cancer can harm the baby and are not safe during pregnancy. If these treatments are needed, they are usually scheduled after the baby is born.
**Radiation therapy:** Radiation therapy to the breast is often used after breast-conserving surgery (lumpectomy) to help reduce the risk of the cancer coming back. The high doses of radiation used for this can harm the baby any time during pregnancy. This may cause miscarriage, birth defects, slow fetal growth, or a higher risk of childhood cancer. Because of this, doctors don’t use radiation treatment during pregnancy.

For some women whose cancer is found later in the pregnancy, it may be possible to have a lumpectomy during pregnancy and then wait until after the baby is born to get radiation therapy. But this treatment approach has not been well-studied. Waiting too long to start radiation can increase the chance of the cancer coming back.

**Hormone therapy:** Hormone therapy is often used as adjuvant treatment after surgery or as treatment for advanced breast cancer in women with hormone receptor-positive (ER-positive or PR-positive) breast cancer. Hormone therapy drugs used for breast cancer include tamoxifen, anastrozole, letrozole, and exemestane.

Hormone therapy should not be used during pregnancy because it can affect the baby. It should be delayed until after the woman has given birth.

**Targeted therapy:** Drugs that target HER2, such as trastuzumab (Herceptin), pertuzumab (Perjeta), ado-trastuzumab emtansine (Kadcyla) and lapatinib (Tykerb), are an important part of the treatment of HER2-positive breast cancers. In women who aren’t pregnant, trastuzumab is used as a part of adjuvant treatment after surgery, pertuzumab can be used with trastuzumab before surgery, and all of these drugs can be useful in treating advanced cancer. But based on animal studies and reports of women who were treated during pregnancy, none of these drugs are considered safe for the baby if taken during pregnancy.

Everolimus (Afinitor) and palbociclib (Ibrance) are also targeted drugs that can be used along with hormone therapy to treat advanced breast cancer. Again, these drugs are not thought to be safe to use during pregnancy.

**Can I breastfeed during cancer treatment?**

Most doctors recommend that women who have just had babies and are about to be treated for breast cancer should stop (or not start) breastfeeding.

If breast surgery is planned, stopping breastfeeding will help reduce blood flow to the breasts and make them smaller. This can help with the operation. It also helps reduce the risk of infection in the breast and can help avoid having breast milk collect in biopsy
Many chemo, hormone, and targeted therapy drugs can enter breast milk and be passed on to the baby. Breastfeeding isn’t recommended if you are getting chemo, hormone, or targeted therapy.

If you have questions, such as when it might be safe to start breastfeeding, talk with your health care team. If you plan to start breastfeeding after you’ve stopped for a while, plan ahead. Breastfeeding experts can give you extra help if you need it.

**How does pregnancy affect survival rates for breast cancer?**

Pregnancy can make it harder to find, diagnose, and treat breast cancer. Most studies have found that the outcomes among pregnant and non-pregnant women with breast cancer are about the same for cancers found at the same stage, but not all studies agree.

Some doctors believe that ending the pregnancy may help slow the course of more advanced breast cancers, and they may recommend that for some women with advanced breast cancer. It’s hard to do research in this area, and good, unbiased studies don’t exist. Ending the pregnancy makes treatment simpler, but older studies that looked at pregnant women did not find that ending the pregnancy improves a woman’s overall survival or cancer outcome. Of note, there were some flaws that could have biased the outcomes of these studies. For example, the women who had more advanced disease were more likely to end their pregnancies. It’s hard to know if outcomes would be different with more modern treatments.

Studies have not shown that the treatment delays that are sometimes needed during pregnancy have an effect on breast cancer outcome, either. But this, too, has proven to be a difficult area to study. Finally, there are no reports showing that breast cancer itself can harm the baby.

- **References**


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1-800-227-2345 or www.cancer.org
Breast Reconstruction Surgery

Deciding Whether To Have Breast Reconstruction

Many women choose to have reconstruction surgery, but it might not be right for everyone. Learn more about the pros and cons of breast reconstruction, as well as other options.

- Should I Get Breast Reconstruction Surgery?
- Breast Reconstruction Alternatives

Breast Reconstruction Options

There are many different options and types of breast reconstruction procedures. Some are done (or started) at the same time as mastectomy, while others are done later. Learn more about your options.

- Breast Reconstruction Options

Know What To Expect

If you’re planning to have breast reconstruction surgery, it’s important to be prepared. Find out what you should ask your surgeon, and what to expect before and after your surgery.

- Questions to Ask Your Surgeon About Breast Reconstruction
- Preparing for Breast Reconstruction Surgery
- What to Expect After Breast Reconstruction Surgery

Should I Get Breast Reconstruction Surgery?
A woman who has surgery to treat breast cancer might choose to have additional surgery to rebuild the shape and look of her breast. This is called breast reconstruction surgery. If you are thinking about having reconstructive surgery, it is best to talk about it with your surgeon and a plastic surgeon experienced in breast reconstruction before you have surgery to remove the tumor or breast. This lets the surgical teams plan the best treatment for you, even if you decide to wait and have reconstructive surgery later.

**Help and support from someone who’s been there**

No matter which options you choose, it’s important to know that there is advice and support out there to help you cope with the changes you’re going through. Speaking with your doctor or other members of your health care team is often a good starting point. If you would like to talk with someone who has had your type of surgery, ask about our [Reach to Recovery program](#). Reach To Recovery volunteers are breast cancer survivors trained to support others facing breast cancer, as well as those who are thinking about having breast reconstruction. They can give you suggestions, reading material, and advice. Ask your doctor or nurse to refer you to a volunteer in your area, or call us at 1-800-227-2345.

**Benefits of breast reconstruction**

A woman might choose to have breast reconstruction for many reasons:

- To make her chest look balanced when she is wearing a bra or swimsuit
- To permanently regain her breast shape
- So she won’t have to use a breast form that fits inside the bra (an external prosthesis)
- To be happier with her body and how she feels about herself

Breast reconstruction often leaves scars, but they usually fade over time. Newer techniques have also reduced the amount of scarring. When you’re wearing a bra, your breasts should be alike enough in size and shape to let you feel comfortable about how you look in most types of clothes.

After a mastectomy, breast reconstruction can make you feel better about how you look and renew your self-confidence. But keep in mind that the reconstructed breast will not be a perfect match or substitute for your natural breast. If tissue from your tummy, shoulder, or buttocks was used as part of the reconstruction, those areas will also look different after surgery. Talk with your surgeon about scars and changes in shape or contour. Ask where they will be, and how they will look and feel after they heal.
Some important things to think about

- You might have a choice between having breast reconstruction at the same time as the mastectomy (immediate reconstruction) or at a later time (delayed reconstruction).
- Some women don’t want to have to make decisions about reconstruction while being treated for their breast cancer. If this is the case, you might choose to wait until after your breast cancer surgery to decide about reconstruction.
- You might not want to have any more surgery than is absolutely needed.
- Not all reconstructive surgery is a total success, and the result might not look like you’d hoped.
- The cancer surgery and reconstruction surgery will leave scars on your breast and any areas where tissue was moved to create the new breast mound, such as the buttocks, tummy, or shoulder areas.
- A rebuilt breast will not feel the same as the natural breast. The sites tissue was taken from to rebuild the breast might also lose some sensation. Over time, the skin might become more sensitive, but it won’t feel the same as it did before the surgery.
- You might have extra concerns if you tend to bleed or scar more than most people.
- Breast skin or flaps might not survive after reconstructive surgery. This tissue death is called necrosis. If it happens, healing is delayed and more surgery is often needed to fix the problem.
- Healing could be affected by previous surgery, chemotherapy, or radiation therapy. It can also be affected by smoking, diabetes, some medicines, and other factors.
- Surgeons might suggest you wait to have reconstruction, especially if you smoke or have other health problems. It’s best to quit smoking at least 2 months before reconstructive surgery to allow for better healing. You might not be able to have reconstruction at all if you are obese, too thin, or have blood circulation problems.
- The surgeon might suggest surgery to reshape your other breast to match the reconstructed breast. This could include reducing or enlarging its size, or even surgically lifting the breast.
- If it’s known at the time of diagnosis that a woman will need radiation as part of her treatment, the types of immediate reconstruction surgery she can have might be limited. Certain types of reconstruction done before radiation can cause problems and lower the chances the rebuilt breast will look and feel as natural as possible, after the radiation is given. You should discuss the best options for you with your surgeon before surgery.
- Knowing your reconstruction options before surgery can help you have more
realistic expectations for the outcomes.

Can breast reconstruction hide cancer or make it come back?

Studies show that reconstruction does not make breast cancer come back. If the cancer does come back, reconstructed breasts should not cause problems finding the cancer or treating it.

If you are thinking about breast reconstruction, either with an implant or flap, you need to know that reconstruction rarely, hides a return of breast cancer. You should not consider this a big risk when deciding to have breast reconstruction.

Risks of breast reconstruction

Common potential side effects and risks of reconstruction surgery can be found in What to Expect After Breast Reconstruction Surgery.

Certain types of breast implants can be linked to a rare kind of cancer, known as anaplastic large cell lymphoma (ALCL). It is sometimes referred to as breast implant-associated anaplastic large cell lymphoma (BIA-ALCL). This lymphoma happens around 8 to 10 years after the implant was placed and more often if the implants have textured (rough) surfaces rather than smooth surfaces. If ALCL does show up after an implant, it can show as a lump, a collection of fluid near the implant, pain, swelling or asymmetry (uneven breasts). It usually responds well to treatment.

- References


Breast Reconstruction Alternatives

What if I choose not to get breast reconstruction?

Some women who have had a mastectomy as part of their breast cancer treatment decide not to have any type of breast reconstruction.
They might decide they don’t want to have any more surgeries than they need to treat the cancer, or that they want to be able to get back to their normal activities as soon as possible. Some women are just more comfortable with how they look and feel after the surgery to remove their cancer. Cost might also be an issue, especially for women who don’t have insurance coverage. If you change your mind later, reconstruction is usually still an option. But keep in mind that it may be easier to get the result you want if you make the decision before you have your mastectomy.

For other women, breast reconstruction might be difficult, or even not possible, because of other health issues they have. For example, you might not be able to have reconstruction if you are obese, too thin, or have blood circulation problems.

Women who don’t have breast reconstruction after surgery have two main options:

- Using a breast form or prosthesis (inside the bra or attached to the body to wear under their clothes)
- Going flat (not wearing a breast form)

**Using a breast form or prosthesis**

A breast form is a prosthesis (artificial body part) worn either inside a bra or attached to the body to simulate the appearance and feel of a natural breast. Wearing a breast form is an option for women who have decided not to get reconstructive surgery but want to keep the same look under their clothes. If you haven’t decided about reconstruction, or are having reconstruction later, you might decide to use a breast form temporarily.

Most breast forms are made from materials that mimic the movement, feel, and weight of natural breast tissue. A properly weighted form provides the balance your body needs for correct posture and anchors your bra, keeping it from riding up. At first, these forms may feel too heavy, but in time they should feel natural.

If you are planning to use a breast form, your doctor will tell you when you have healed enough to be fitted for a permanent breast form or prosthesis.

**Choosing the right bra for your breast form**

The right bra for you may very well be the one you have always worn. It may or may not need adjustments. If there is tenderness during healing, a bra extender can help by increasing the circumference of the bra so that it does not bind the chest too tightly. Heavy-breasted women can relieve pressure on shoulder straps by slipping a bra
shoulder pad under one or both straps.

If you decide to wear your breast form in a pocket in your bra, you can have your regular bra adapted. There are also special mastectomy bras with the pockets already sewn in. If the breast form causes any kind of skin irritation, use a bra with a pocket. If your bra has underwires, you may be able to wear it, but be sure to clear this with your doctor.

If you want to wear your prosthesis under sleepwear but would like something more comfortable than a regular bra, look for a soft bra, sometimes called a leisure or night bra. These are in most department stores.

**Finding and paying for breast prostheses**

Prices for breast forms vary considerably. High price doesn't necessarily mean that the product is the best for you. Take time to shop for a good fit, comfort, and an attractive, natural appearance in the bra and under clothing. Your clothes should fit the way they did before surgery.

Insurance coverage of breast prostheses can vary. Be sure to contact your health insurance provider to find out what will be covered and how you must submit claims. Also, ask your doctor to write prescriptions for your prosthesis and for any special mastectomy bras. When purchasing bras or breast forms, mark the bills and any checks you write "surgical." Medicare and Medicaid can be used to pay for some of these expenses if you are eligible. The cost of breast forms and bras with pockets might be tax deductible, and also the cost if you have a bra altered. Keep careful records of all related expenses.

Some insurance companies will not cover both a breast prosthesis and reconstructive surgery. That can mean that if you submit a claim for a prosthesis or bra to your insurance company, in some cases the company will not cover reconstruction, should you choose this procedure in the future. Make sure you get all the facts before submitting any insurance claims.

**Going flat**

Some women, who do not have reconstruction surgery, decide not to wear a breast form, either.

For most women, there aren't likely to be any added health issues from going flat,
especially if both breasts were removed. But if you’ve only had one breast removed, you might notice issues with balance, posture, or back pain, especially if you’ve always had large breasts. This is one reason some women prefer to wear a breast form – to balance out the weight on their chest. Talk to your doctor about your options if you think this might be an issue for you.

Some women might use a breast form when out but not when at home. This might be because they find breast forms uncomfortable or too expensive, or just because they’re comfortable with how they look and feel without a breast form and don’t feel the need to wear one.

If the idea of going flat appeals to you but you’re worried about what others might think, try going without a breast form in different situations, such as at home, out with friends, or while out running errands. You might find that most people won’t notice a difference. If you find you still feel self-conscious, you can always go back to wearing a breast form.

If you decide to go flat, you might want to consider wearing clothing that might help you feel more comfortable with your appearance. Try wearing tops that are not tight fitting and that have busy patterns, or layer sweaters or jackets over close-fitting tops. Scarves and shawls can also cover all or part of your chest.

Some women might like the idea of going flat but are uncomfortable about not having nipples. Some companies now make nipple prosthetics, which are made of silicone or other materials and look and feel like real nipples. They can be attached to the chest and then taken off when you choose.

- **References**


Breast Reconstruction Options

Women who have had surgery to treat breast cancer can choose from several types of breast reconstruction. When deciding what type is best for you, you and your doctors should discuss factors including your health and your personal preferences. Take the time to learn about what options are available to you and consider talking to others who have had that procedure before you make a decision.

Choosing which type of breast reconstruction to have

If you’ve decided to have breast reconstruction, you’ll still have many things to think about as you and your doctors talk about what type of reconstruction might be best for you. Some of the factors you and your doctors will need to think about when considering your options include:

- Your overall health (including issues that might affect your healing, such as smoking or certain health conditions)
- The size and location of your breast cancer
- Your breast size
- The extent of your breast cancer surgery
- Whether you will need treatments other than surgery for your cancer
- The amount of tissue available (for example, very thin women may not have enough extra tummy tissue to use this area for breast reconstruction)
- Whether you want reconstructive surgery on one or both breasts
- Your desire to match the look of the other breast
- Your insurance coverage and related costs for the unaffected breast
- How quickly you want to be able to recover from surgery
- Your willingness to have potentially more than one surgery as part of the reconstruction
- How different types of reconstructive surgery might affect other parts of your body

Your surgeon will review your medical history and overall health, and will explain which reconstructive options might be best for you based on your age, health, body type, lifestyle, goals, and other factors. Talk with your surgeon openly about your preferences. Be sure to voice any concerns and priorities you have for the
reconstruction, and find a surgeon you feel comfortable with. Your surgeon should explain the limits, risks, and benefits of each option.

**Types of breast reconstruction procedures**

There are several types of reconstructive surgery available, and sometimes the process means more than one operation. Give yourself plenty of time to make the best decision for you. You should make your decision about breast reconstruction only after you are fully informed.

Two main types of operations can be done to reconstruct the shape of your breast or breasts:

- Using silicone or saline breast inserts known as Breast implants
- Using your own body tissues known as Tissue flap procedures

Sometimes the implant and flap procedures are used in combination to reconstruct a breast.

In addition, nipple/areola tattooing and fat grafting can be done to help make the reconstructed breast look more like the original breast. The reconstructed nipple and areola do not have any sensation.

**Reconstruction after Lumpectomy or Partial Mastectomy**

Most women who have breast conservation surgery (lumpectomy or partial mastectomy) do not need breast reconstruction. However, some women might end up having a breast deformity as a result of the cancer surgery; for example, if a woman has a large tumor in a small breast. These women may be candidates for different types of breast reconstruction (such as smaller implants or fat grafting) to reshape the breast. This type of surgery has outcomes similar to lumpectomy or partial mastectomy without reconstruction.

- **References**


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Breast Reconstruction Using Implants

Using a breast implant is one option for reconstructing the shape of your breast after surgery to remove the cancer. Several types of implants can be used. This type of breast reconstruction can be done at the same time as the cancer surgery. Or it can be started when you have your cancer surgery and then completed later. You should understand the benefits and risks of implants for breast reconstruction and discuss them with your doctor.

What types of implants are used for breast reconstruction?

Several different types of breast implants can be used to rebuild the breast. Implants are made of a flexible silicone outer shell, which can contain:

- **Saline**: These implants are filled with sterile (germ-free) salt water. These types of implants have been in use the longest.

- **Silicone gel**: Gel implants tend to feel a bit more like natural breast tissue. **Cohesive gel implants** are a newer, thicker type of silicone implant. The thickest ones are sometimes called “gummy bear” implants. They are more accurately called form-stable implants, meaning that they keep their shape even if the shell is cut or broken. They are firmer than regular implants and might be less likely to rupture (break), although this is still possible.
There are different shapes and sizes of saline and silicone implants and they can have either smooth or textured (rough) surfaces. Any type of implant might need to be replaced at some point if it leaks or ruptures. Concerns have been raised in the past about possible health issues from ruptured silicone-filled implants. But most recent studies show that silicone implants do not increase the risk of health problems, and they have been approved by the US Food and Drug Administration for use since 2006.

Other types of implants that have different shells and are filled with different materials are being studied, but are only available if you are participating in a clinical trial.

**How are implant procedures done?**

You might have a choice between having breast reconstruction at the same time as the surgery to treat the cancer (immediate reconstruction) or later (delayed reconstruction).

**Immediate breast reconstruction (also called direct-to-implant reconstruction)** is done, or at least started, at the same time as surgery to treat the cancer. The implant is put in at the same time as the mastectomy is done. After the surgeon removes the breast tissue, a plastic surgeon puts in a breast implant. The implant is usually put under the muscle on your chest. A special type of graft (made from skin) or an absorbable mesh is sometimes used to hold the implant in place, much like a hammock or sling.

The benefit of immediate reconstruction is that breast skin is often preserved, which can produce better-looking results. Women also do not have to go without the shape of a breast.

While the first step in reconstruction is often the major one, many steps are often needed later to get the final shape or appearance. If you’re planning to have immediate reconstruction, be sure to ask what will need to be done afterward and how long it will take.

**Delayed breast reconstruction** means that rebuilding is started later, after the cancer surgery is done. For this type of reconstruction, a short-term tissue expander is put in during the mastectomy to help prepare for reconstructive surgery later. The expander is a balloon-like sac that starts off flat and is slowly expanded to the desired size to allow the skin to stretch. Once the skin over the breast area has stretched enough, a second surgery is done to remove the expander and put in the permanent implant. (Some expanders can be left in place as the final implant.)

This method allows time for other cancer treatment options. If radiation therapy is
needed, the expander can be filled during other treatments (such as chemotherapy), but
the final placement of the implant is put off until radiation treatment is complete. If
radiation is not part of the treatment plan, the surgeon can start filling the tissue
expander after surgery.

Two types of expanders are available:

- In one type, the surgeon injects a salt-water solution through a tiny valve under the
  skin at regular intervals ( every 1, 2, or 3 weeks) to fill the expander over several
  months.
- In the other type, known as AeroForm®, the expander contains compressed carbon
dioxide gas. The patient uses a remote control to release small amounts of the gas
into the expander several times a day over 2 to 3 weeks.

You might choose to delay breast reconstruction if:

- **You don’t want to think about reconstruction while coping with the cancer
treatment.** If this is the case, you might choose to wait until after your breast cancer
surgery to decide about reconstruction.
- **You have other health problems.** Your surgeon may suggest you wait for one
  reason or another, especially if you smoke or have other health problems. It’s best
to quit smoking at least 2 months before reconstructive surgery to allow for better
healing.
- **You need radiation therapy.** Many doctors recommend that women not have
  immediate reconstruction if they will need radiation treatments after surgery.
  Radiation can cause problems after surgery such as delayed healing and scarring,
  and can lower the chances of success. Flap reconstruction surgeries (using other
  body tissues to create the new breast) are often delayed until after radiation

Your surgical team will discuss the best reconstruction options for you taking into
account your medical history, body shape, cancer treatment and personal goals.

**Tissue support when implants are used**

Tissue support is sometimes needed for breast reconstruction, especially when implants
are used. This tissue can provide added coverage over the implant, hold the implant in
place, or position the muscle where it needs to be.

One way to do this is to use a woman’s own body tissues as part of a flap procedure.
Tissue from another part of the body, such as the tummy or back, is used to create a
kind of pocket to hold the implant in place or to provide added skin coverage over the
implant. See Breast Reconstruction Using Your Own Tissues (Flap Procedures) for more information.

Some products use donated human skin to support implants or transplanted tissues. These are known as *acellular dermal matrix* products because they have had the human cells removed. This reduces any risk that they carry diseases or that the body will reject them. They are used to extend and support natural tissues and help them grow and heal.

Doctors can also use animal skin (usually from a pig) with the cells removed (an acellular matrix such as Strattice™ or Permacol™), and other methods for internal support.

The acellular matrix products are newer in breast reconstruction. Studies that look at outcomes are still being done, but they have been promising overall. This type of tissue is not used by every plastic surgeon, but it is becoming more widely available. Talk with your doctor about whether these materials will be used in your reconstruction and about their benefits and risks.

**Things to think about before getting implants**

Most women will do well with implants. But there are some important factors to keep in mind if you are thinking about having implants to reconstruct the breast and/or to make the other breast match the reconstructed one:

- You may need more surgery to remove and/or replace your implant later. In fact, up to half of implants used for breast reconstruction have to be removed, modified, or replaced within 10 years.
- You might have problems with breast implants. They can break (rupture) or cause infection or pain. Scar tissue may form around the implant (called capsular contracture), which can make the breast harden or change shape, so that it no longer looks or feels like it did just after surgery. Most of these problems can be fixed with surgery, but others might not be reversible.
- MRIs may be needed every few years to make sure silicone gel implants have not broken. Your health insurance may not cover this.
- Routine mammograms to check your remaining breast for cancer could be harder if you have a breast implant there – you may need more x-rays of the breast, and the compression may be more uncomfortable.
- An implant in the remaining breast could affect your ability to breastfeed, either by
reducing the amount of milk or stopping your body from making milk.

- **References**


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US Food and Drug Administration. Questions to Ask Before Having Breast Implant
Breast Reconstruction Using Your Own Tissues (Flap Procedures)

A tissue flap procedure (also known as autologous tissue reconstruction) is one way to rebuild the shape of your breast after surgery to remove the cancer. As with any surgery, you should learn as much as possible about the benefits and risks, and discuss them with your doctor, before having the surgery.

These procedures use tissue from other parts of your body, such as your tummy, back, thighs, or buttocks to rebuild the breast shape. Tissue flaps generally look more natural and behave more like natural breast tissue than breast implants. For instance, they may enlarge or shrink as you gain or lose weight. And while breast implants sometimes need to be replaced (if the implant ruptures, for example), this is not a concern with tissue flaps. Tissue flaps are often used by themselves to reconstruct the breast, but some tissue flap procedures can be used with a breast implant.

Tissue flap procedures can also have some potential downsides that need to be considered:
In general, flaps require more surgery and a longer recovery than breast implant procedures.

- Flap operations leave 2 surgical sites and scars – one where the tissue was taken from (the **donor site**) and one on the reconstructed breast. The scars fade over time, but never go away completely.
- Some women can have donor site problems such as abdominal hernias and muscle damage or weakness.
- Because healthy blood vessels are needed for the tissue’s blood supply, flap procedures may not be the best option for smokers, and in women who have uncontrolled diabetes, vascular disease (poor circulation), or connective tissue diseases.

**Types of tissue flap procedures**

The most common types of tissue flap procedures are:

- **TRAM** (transverse rectus abdominis muscle) flap uses tissue from the abdomen (tummy)
- **DIEP** (deep inferior epigastric perforator) flap uses tissue from the abdomen (tummy)
- **Latissimus dorsi flap** - uses tissue from the upper back
- **GAP (gluteal artery perforator) flap** (also known as a **gluteal free flap**) uses tissue from the buttocks
- **TUG (transverse upper gracilis) flap** uses tissue from the inner thigh

**TRAM flap**

The **TRAM flap** procedure uses tissue and muscle from the tummy. Sometimes an implant is used with this type of flap, but some women have enough tissue in this area to shape the breast so that an implant isn’t needed. The skin, fat, blood vessels, and at least one abdominal muscle are moved from the belly to the chest. The TRAM flap procedure can tighten the lower belly, resulting in a “tummy tuck,” but it can also decrease the strength in your belly muscles. A TRAM flap may not be possible in women who are very thin or who have had abdominal tissue removed before.

There are different types of TRAM flaps:
• **A pedicle TRAM flap** leaves the flap attached to its original blood supply and tunnels it under the skin to the chest. It usually requires removing most if not all of the rectus abdominis muscle on that side, which means an increased risk of bulging and/or hernia on one side of the abdomen. This can also mean your abdominal (belly) muscles may not be as strong as before the surgery.

• **A free TRAM flap** moves tissue (and usually less muscle) from the same part of the lower abdomen, but the flap is completely removed and moved up to the chest. The blood vessels (arteries and veins) must then be reattached. This requires the use of a microscope (*microsurgery*) to connect the tiny vessels, and the surgery takes longer than a pedicle TRAM flap. The blood supply to the flap is usually better than with pedicle flaps, there is less risk of losing abdominal muscle strength, and the donor site (abdomen) often looks better. The main risk is that sometimes the blood vessels get clogged and the flap doesn’t work.

**Transverse rectus abdominis muscle or TRAM flap**

The illustration above depicts a free flap, in which the tissue is cut free from its original location and reattached in the chest area.
DIEP flap

The **DIEP (deep inferior epigastric perforator) flap** uses fat and skin from the same area as the TRAM flap but does not use the muscle to form the breast shape. This method uses a free flap, meaning that the tissue is completely cut free from the tummy and then moved to the chest. As in the free TRAM surgery, a microscope is needed to connect the tiny blood vessels. There’s less risk of a bulge or hernia because no muscle is taken. A related procedure, known as a **SIEA (superficial inferior epigastric artery) flap**, uses basically the same tissues but different blood vessels.

Latissimus dorsi flap

The **latissimus dorsi flap** is often used along with a breast implant. For this procedure, the surgeon tunnels muscle, fat, skin, and blood vessels from your upper back, under the skin to the front of the chest. This provides added coverage over an implant and makes a more natural-looking breast than just an implant alone. This type of reconstruction can sometimes be used without an implant. Rarely, some women can
have weakness in their back, shoulder, or arm after this surgery.

**Gluteal free flap (GAP flap)**

The **gluteal free flap** or **GAP flap** is a type of reconstruction surgery that uses tissue from the buttocks to create the breast shape. The gluteal free flap might be an option for women who cannot or do not wish to use the tummy sites due to thinness, previous incisions, failed tummy flap, or other reasons, but it’s not offered at all surgical centers. The method is much like the free TRAM flap mentioned above, except no muscle is taken. The skin, fat, and blood vessels are cut out of the buttocks and then moved to the chest.
Inner thigh or TUG flap

A newer option for women who can’t or don’t want to use TRAM or DIEP flaps is a surgery that uses muscle and fatty tissue from along the bottom fold of the buttock extending to the inner thigh. This is called the **transverse upper gracilis flap** or **TUG flap**, and it’s only available in some medical centers. The skin, muscle, and blood vessels are cut out and moved to the chest, and the tiny blood vessels are connected to their new blood supply.

Women with thin thighs don’t have much tissue here, so the best candidates for this type of surgery are women whose inner thighs touch and who need a smaller or medium-sized breast. If you have larger breasts, you might need a breast implant as well. Sometimes the location of the donor site causes healing problems, but they tend to be minor and easily treated.
Fat grafting

A newer technique can take a person’s fat from one part of the body (buttocks, thighs, or abdomen) and transfer it to the reconstructed breast to help fix any shape abnormalities that may be seen after the initial breast reconstruction surgery is done. The fat is obtained by liposuction, cleaned and then dissolved so it can be injected easily into the areas it is needed. This procedure has been found to be safe as far as cancer recurrence in patients who have had mastectomies.

Reconstructing the Nipple and Areola After Breast Surgery
When treating breast cancer with a mastectomy, the nipple is typically removed along with the rest of the breast. (Some women might be able to have a nipple-sparing mastectomy, where the nipple is left in place. This is discussed in more detail on our page about mastectomy.)

If you’re having breast construction after your mastectomy, you can decide if you want to have the nipple and the dark area around the nipple (areola) reconstructed through surgery or tattooing, or both.

**Nipple and areola reconstruction**

Nipple and areola reconstructions are usually the final phase of breast reconstruction. This is a separate surgery done to make the reconstructed breast look more like the original breast. It can be done as an outpatient procedure. It’s usually done about 3 to 4 months after surgery after the new breast has had time to heal.

Ideally, nipple and areola reconstruction tries to match the position, size, shape, texture, color, and projection of the new nipple to the natural one (or to the other one, if both nipples are being reconstructed). Tissue used to rebuild the nipple and areola comes from the newly created breast or, less often, from another part of your body (such as the inner thigh). In some cases, doctors build up the areola and nipple area with donor skin that’s had the cells removed. If a woman wants to match the color of the nipple and areola of the other breast, tattooing may be done a few months after the surgery.

Some women opt to have just the tattoo, without nipple and areola reconstruction. A skilled plastic surgeon or other professional may be able to use pigment in shades that make the flat tattoo look 3-dimensional.

**Nipple prosthetics**

Another option for women who might not want further surgery or tattooing are nipple prosthetics, which are made of silicone or other materials and look and feel like real nipples. They can be attached to the chest and then taken off when you choose.

- **References**

Questions to Ask Your Surgeon About Breast Reconstruction

If you’ve had surgery to treat your breast cancer and are considering breast reconstruction, it’s important to know as much as you can about what to expect. Your breast surgeon can help you find a plastic surgeon who should be able to explain all of
your choices and answer your questions. Here are some questions to ask to help get you started. Be sure you get all of your questions answered, so that you can make the best decisions for you about breast reconstruction.

Finding the right plastic surgeon for your breast reconstruction

If you decide to have breast reconstruction, you’ll need to find an experienced board-certified plastic surgeon. Your breast surgeon can suggest doctors for you.

To find a board certified plastic surgeon in your area, or to find out if your surgeon is board certified, contact the American Society of Plastic Surgeons (ASPS).

Getting a second opinion

It’s common to get a second opinion before having surgery. Don’t rush to get reconstruction surgery, or even mastectomy, before you know all of your options. It’s more important for you to make the right decisions based on complete information than to act quickly.

Questions to ask about breast reconstruction

It’s very important to get all of your questions answered by your plastic surgeon before having breast reconstruction. If you don’t understand something, ask your surgeon about it. You might want to take notes or bring a partner or friend with you to the doctor to help remember what was said and to help ask other questions.

Here are some questions to get you started. Write down other questions as you think of them. The answers to these questions may help you make your decisions.

- Can I have breast reconstruction?
- When can I have reconstruction done?
- What are the pros and cons of doing it at the same time as my cancer surgery (immediate reconstruction) versus waiting (delayed reconstruction)?
- Will reconstruction interfere with chemotherapy?
- Will reconstruction interfere with radiation therapy?
- What types of reconstruction could I have?
- What are the pros and cons with each option?
• What type of reconstruction do you think would be best for me? Why?
• What’s the average cost of each type? Will my insurance cover them?
• How long would it take me to recover from each type?
• How many of these procedures have you (plastic surgeon) done?
• What results can I expect?
• Will the reconstructed breast match my other breast?
• Should I consider surgery on the other breast as well to help them match?
• Could I have the nipple reconstructed if I choose to? How would this be done?
• How will my reconstructed breast(s) feel to the touch?
• Will I have any feeling in my reconstructed breast(s)?
• What possible problems should I know about?
• If using a tissue flap, will there be pain, scars, or other changes in the parts of my body where the tissue is taken from?
• If I get a breast implant, how long will it last?
• What kinds of changes to the breast can I expect over time?
• How will aging affect the reconstructed breast?
• What happens if I gain or lose weight?
• Are there any new reconstruction options that I should know about, including clinical trials?
• Can you show me pictures of typical results?
• Can I talk with other women who have had the same surgery?

References


Preparing for Breast Reconstruction Surgery

Your surgeon can help you know what to expect from your breast reconstruction surgery and be as prepared as possible. You should have realistic expectations of how your body will look and feel after surgery, and understand the benefits and risks of the type of reconstruction you are having. Ask questions and follow your surgeon’s instructions carefully. Some questions that may help you include:

- What should I do to get ready for surgery?
- How much discomfort or pain will I feel after surgery?
- How long will I be in the hospital?
- Will I need blood transfusions?
- How long will it take me to recover?
- What will I need to do at home to care for my incisions (surgical scars)?
- Will I have a drain (tube that lets fluid out of the wound) when I go home?
- How much help will I need at home to take care of my drain and wound?
- Will I be taught exercises to do after surgery? When can I start them?
- How much activity can I do at home?
• What do I do if my arm swells?
• When will I be able to go back to normal activities such as driving and working?

Knowing what to expect

As you prepare for breast reconstruction surgery, ask your surgeon what to expect. Breast reconstruction can make you feel better about how you look and renew your self-confidence, but keep in mind that the reconstructed breast will not be a perfect match or substitute for your natural breast. If tissue from your tummy, shoulder, or buttocks will be used, those areas will also look different after surgery. Talk with your surgeon about surgical scars and changes in shape or contour. Ask where they will be, and how they will look and feel after they heal.

Your surgeon (or other doctors involved) should explain the details of your surgery, including:

• The drugs (anesthesia) that will be used to make you sleep and not feel pain during the surgery
• Where the surgery will be done
• How long the surgery will take
• Possible complications of surgery
• What to expect after surgery
• The plan for follow-up
• Costs

Understanding your surgery costs

Health insurance policies often cover most or all of the cost of reconstruction after a mastectomy, but this might not always be the case if you have reconstruction after breast-conserving surgery (lumpectomy). Check your policy to make sure you are covered, and find out what portion of the bill you’ll be expected to pay. Also, see if there are any limits on what types of reconstruction are covered.

Before surgery, make sure your insurance company will not deny breast reconstruction costs (for mastectomy or lumpectomy). Your surgeon may be able to help you with this if your insurance plan wants to deny coverage, so be sure to ask. It may take some time and effort. In the past, health plans have denied coverage for certain reconstruction procedures despite federal laws that require coverage in most cases. They often reverse such decisions on appeal.
Getting ready for surgery

Your breast surgeon and your plastic surgeon should give you clear instructions on how to prepare for surgery. These will probably include:

- Help with quitting smoking if you’re a smoker
- Instructions to take or avoid certain vitamins, medicines, and dietary or herbal supplements for a period of time before your surgery
- Instructions on eating and drinking before surgery

Plan to have someone take you home after your surgery or your stay in the hospital. You may also need them to stay and help you out for a few days or longer.

Where your surgery will be done

Breast reconstruction often means having more than one operation. The first creates the breast mound. This may be done at the same time as the mastectomy or later on. It’s usually done in a hospital.

If follow-up procedures such as filling expanders or creating the nipple and areola are needed, they may also be done in the hospital, or they may be done in an outpatient facility. This decision depends on how much surgery is needed and what your surgeon prefers, so you’ll need to ask about this.

What anesthesia will be used

The first stage of reconstruction is almost always done using general anesthesia. This means you’ll be given drugs to make you sleep and not feel pain during the surgery.

Follow-up procedures may only need local anesthesia. This means that only the area the doctor is working on will be numbed. A sedative drug may also be used to make you feel relaxed but awake. You might feel some discomfort.

Be aware of the possible risks

Certain risks go along with any type of surgery, and breast reconstruction may pose certain unique problems for some women. Your surgeon will go over the possible risks of reconstruction surgery with you. Be sure to ask questions if there’s anything you’re not sure about. For more on the possible risks after surgery, see What to Expect After
Breast Reconstruction Surgery.

- References


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**What to Expect After Breast Reconstruction Surgery**

It’s important to have an idea of what to expect after surgery to rebuild your breast, including the possible risks and side effects. The time it takes you to recover from
surgery will depend on the type of reconstruction you have. Most women begin to feel better in a couple of weeks and can return to usual activities in a couple of months. Talk to your doctor about what you can expect. Be sure you understand how to take care of your surgery sites and how to follow up with your breast care, including regular mammograms and when they are needed depending on the surgery you have had.

**Possible risks during and after reconstruction surgery**

Any type of surgery has risks, and breast reconstruction may pose certain unique problems for some women. Even though many of these are not common, it’s important to have an idea of the possible risks and side effects.

Some of the risks during or soon after surgery include:

- Problems with the anesthesia
- Bleeding
- Blood clots
- Fluid build-up in the breast or the donor site (for a tissue flap), with swelling and pain
- Infection at the surgery site(s)
- Wound healing problems
- Extreme tiredness (fatigue)

Problems that can occur later on include:

- Tissue death (necrosis) of all or part of a tissue flap, skin, or fat
- Loss of or changes in nipple and breast sensation
- Problems at the donor site, such as loss of muscle strength
- The need for more surgery to fix problems that come up
- Changes in the arm on the same side as the reconstructed breast
- Problems with a breast implant, such as movement, leakage, rupture, or scar tissue formation (capsular contracture)
- Uneven breasts

**Risks of infection**

Infection can happen with any surgery, most often in the first couple of weeks after surgery. If an implant has been placed, it might have to be removed until the infection clears. A new implant can be put in later. If you have a tissue flap, surgery may be needed to clean the wound.
Risks of capsular contracture

The most common problem with breast implants is **capsular contracture**. A scar (or capsule) can form around the soft implant. As it tightens, it can start to squeeze the implant, making the breast feel hard. Capsular contracture can be treated. Sometimes surgery can remove the scar tissue, or the implant can be removed or replaced.

Additional risks for smokers

Using tobacco narrows blood vessels and reduces the supply of nutrients and oxygen to tissues. As with any surgery, smoking can delay healing. This can cause more noticeable scars and a longer recovery time. Sometimes these problems are bad enough that a second operation is needed to fix them. You may be asked to quit smoking a few weeks or months before surgery to reduce these risks. This can be hard to do, so ask your doctor for help.

Recovering after reconstruction surgery

You’re likely to feel tired and sore for a week or 2 after implant surgery, or longer after a flap procedure (which will leave you with 2 surgical wounds). Your doctor will give you medicines to help control pain and other discomfort.

Depending on the type of surgery you have, you will most likely be able to go home from the hospital within a few days. You may be discharged with one or more drains in place. A drain is a small tube that’s put in the wound to remove extra fluid from the surgery site while it heals. In most cases, fluid drains into a little hollow ball that you’ll learn how to empty before you leave the hospital. The doctor will decide when the drains can be safely removed depending on how much fluid is collecting each day. Follow your doctor’s instructions on wound and drain care. Also be sure to ask what kind of support garments you should wear. If you have any concerns or questions, ask someone on your cancer care team.

Getting back to normal

Most women can start to get back to normal activities within about 6 to 8 weeks. If implants are used without flaps, your recovery time may be shorter. Some things to keep in mind:

- Reconstruction does not restore normal feeling to your breast, but some feeling
may return over a period of years.

- It may take up to about 8 weeks for bruising and swelling to go away. Try to be patient as you wait to see the final result.
- It may take as long as 1 to 2 years for tissues to heal fully and scars to fade, but the scars never go away completely.
- Ask when you can go back to wearing regular bras. Talk with your surgeon about the type of bra to wear – sometimes it will depend on the type of surgery you had. After you heal, underwires and lace might feel uncomfortable if they press on scars or rub your skin.
- Follow your surgeon’s advice on when to begin stretching exercises and normal activities, because it’s different with different types of reconstruction. As a basic rule, you’ll want to avoid overhead lifting, strenuous sports, and some sexual activities for 4 to 6 weeks after reconstruction. Check with your surgeon for specific guidance.
- Women who have reconstruction months or years after a mastectomy may go through a period of emotional adjustment once they’ve had their breast reconstructed. Just as it takes time to get used to the loss of a breast, it takes time to start thinking of the reconstructed breast as your own. Talking with other women who have had breast reconstruction might be helpful. Talking with a mental health professional might also help you sort out anxiety and other distressing feelings.
- Silicone gel implants can open up or leak inside the breast without causing symptoms. Surgeons usually recommend getting regular magnetic resonance imaging (MRI) of implants to make sure they aren’t leaking. (This isn’t needed with saline implants.) You’ll likely have your first MRI 1 to 3 years after your implant surgery and every 2 years from then on, although it may vary by implant. Your insurance might not cover this. Be sure to talk to your doctor about long-term follow-up.
- Call your doctor right away if you notice any new skin changes, swelling, lumps, pain, or fluid leaking from the breast, armpit, or flap donor site, or if you have other symptoms that concern you.

**Talk to your doctors about the need for mammograms**

Women who have had a mastectomy to treat breast cancer generally do not need routine screening mammograms on the side that was affected by cancer (although they still need them on the other breast). There isn’t enough tissue remaining after a mastectomy to do a mammogram. Cancer can come back in the skin or chest wall on that side, but if this happens it’s more likely to be found on a physical exam.
It’s possible for women with reconstructed breasts to get mammograms, but experts agree that women who have breast reconstruction after a mastectomy don’t need routine mammograms. Still, if an area of concern is found during a physical exam, a diagnostic mammogram may be done. (Ultrasound or MRI may also be used to look at the area closely.)

If you have a breast implant and you need a mammogram, be sure to get it done at a facility with technologists trained in moving the implant to get the best possible images of the rest of the breast. Pictures can sometimes be impaired by implants, more so by silicone than saline. Be sure your technologist knows about your implant before starting the mammogram.

If you’re not sure what type of mastectomy you had or whether you need to get mammograms, ask your doctor.

- References


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Living as a Breast Cancer Survivor

Living as a Survivor

Learn more about living as a cancer survivor and get information about next steps.

- Emotions and Breast Cancer
- Body Image and Sexuality After Breast Cancer
- Pregnancy After Breast Cancer

Cancer Concerns After Treatment

Treatment may remove or destroy the cancer, but it is very common to worry about the risk of developing another cancer.

- Follow up Care After Breast Cancer Treatment
- Can I Lower My Risk of Breast Cancer Progressing or Coming Back?
- Second Cancers After Breast Cancer
- Menopausal Hormone Therapy After Breast Cancer

Emotions and Breast Cancer

During your treatment, you may find yourself overwhelmed by many different emotions. This happens to a lot of women. Some amount of depression, anxiety, and fear is normal when breast cancer is a part of your life. A certain amount of distress is normal as well. Some women are affected more than others. But everyone can benefit from help and support from other people, whether friends and family, religious groups, support groups, professional counselors, or others.

Emotional issues can arise after treatment as well. For example, you’ll probably be concerned that the cancer might come back. Maybe you’re more aware of the effects
the cancer has had on your family, friends, and career. You may take a new look at your relationships with those around you. Unexpected issues might also cause concern. For instance, you might be stressed by financial concerns resulting from your treatment. You might also see your health care team less often after treatment and have more time on your hands. Any of these things might make you anxious.

**Special issues women with breast cancer face**

Many women with breast cancer face additional stressful issues. For example, your appearance might have changed as a result of breast cancer surgery. You may also have concerns about **sexuality** after breast cancer. For more on these topics, see [Body Image and Sexuality After Breast Cancer](#).

For younger breast cancer survivors, changes in appearance and sexuality might be even more stressful. Some women might still be thinking about starting a family or having more children, and might worry about how the cancer and its treatment might affect this. Others might have already started families and might worry about how this could affect them. For some women, chemotherapy can cause early menopause, which can be very distressing on its own.

Regardless of the changes you experience, it's important to know that there is advice and support out there to help you cope.

**Finding help and support**

Almost everyone who is going through or has been through cancer can benefit from some type of support. You need people you can turn to for strength and comfort. Support can come in many forms: family, friends, cancer support groups, religious or spiritual groups, online support communities, or one-on-one counselors. What's best for you depends on your situation and personality. Some people feel safe in peer-support groups or education groups. Others would rather talk in an informal setting, such as church. Others may feel more at ease talking one-on-one with a trusted friend or counselor. Whatever your source of strength or comfort, make sure you have a place to go with your concerns.

There are many support groups available, such as the American Cancer Society [Reach To Recovery program](#). This program matches you with a local volunteer who has had breast cancer. As someone who’s been through the experience, your Reach To Recovery volunteer can answer many of your questions.
The cancer journey can feel very lonely. You shouldn’t feel the need to try to deal with everything on your own, and your friends and family may feel shut out if you don’t include them. Let them in, and let in anyone else who you feel may help.

If you aren’t sure who can help, call your American Cancer Society at 1-800-227-2345 and we can put you in touch with a group or resource that may work for you.

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Body Image and Sexuality After Breast Cancer

Learning to be comfortable with your body during and after breast cancer treatment is a personal journey, one that is different for every woman. Information and support can help you cope with these changes over time.

Feeling good about your body during and after breast cancer treatment

Along with the emotional stress that cancer and its treatment can cause, many women with breast cancer also find themselves coping with changes in their appearance as a result of their treatment.

Some changes may be short term, such as hair loss. But even short-term changes can have a profound effect on how a woman feels about herself. A number of options are available to help you cope with hair loss, including wigs, hats, scarves, and other accessories. Alternatively, some women choose to use their baldness as a way to identify themselves as breast cancer survivors.

Other changes are more permanent, like the loss of part or all of a breast (or breasts) after surgery. Some women choose to have reconstructive surgery to rebuild the breast mound. If you decide not to have breast reconstruction, you can decide whether to wear a breast form or prosthesis or not.
Sexuality after breast cancer

You may have concerns about sexuality after breast cancer. Physical changes, especially after breast surgery, can make some women less comfortable with their bodies. There may be a loss of sensation in the affected breast. Other treatments for breast cancer, such as chemotherapy, can change your hormone levels and may affect your sexual interest and/or response.

Relationship issues are also important. Your partner may worry about how to express love physically and emotionally after treatment, especially after surgery. But breast cancer can be a growth experience for couples – especially when partners take part in decision-making and go along to treatments.

To learn more, see Sexuality for the Woman with Cancer.

Finding help and support

Regardless of the changes you may experience, it's important to know that there is advice and support out there to help you cope with them. Speaking with your doctor or other members of your health care team is often a good starting point. There are also many support groups available, such as the American Cancer Society Reach To Recovery program. This program matches you up with a local volunteer who has had breast cancer. Your Reach To Recovery volunteer can answer many of your questions. She can give you suggestions, additional reading material, and advice. Remember that she's been there and will probably understand.

Some studies suggest that younger women, who represent about 1 out of 9 breast cancer survivors, tend to have more problems adjusting to the stresses of breast cancer and its treatment. It can feel socially isolating. Younger women may also be more affected by issues of sexuality or fertility. If you are having trouble adjusting after a breast cancer diagnosis, look for a counselor or a support group directed at younger breast cancer survivors.

References

Many women are able to become pregnant after treatment for breast cancer. However, some treatments can make it harder to get pregnant. If you think you may want to have children one day, or just want to keep your options open, the best time to talk to your doctor about fertility is before you begin breast cancer treatment.

Breast cancer is most common in older women. But if you are a younger woman who has had breast cancer, you might have questions about how breast cancer could affect your ability to have children and whether there are any extra risks.

Can I have a baby after having breast cancer?

Some treatments for breast cancer may affect a woman’s fertility (ability to have a baby). For example, chemotherapy for breast cancer might damage the ovaries, which can sometimes cause immediate or delayed infertility. Still, many women are able to become pregnant after treatment. The best time to talk with your doctor about fertility is before starting breast cancer treatment. For more about how cancer treatment can affect fertility, see Fertility and Women With Cancer.

Could pregnancy and breastfeeding make my breast cancer come back?

Many breast cancers are sensitive to estrogen, so there has been concern that for women who have had breast cancer, the high hormone levels that result from a pregnancy might increase the chance of the cancer coming back. Studies have shown, though, that pregnancy does not increase the risk of the cancer coming back after successful treatment.

There’s also no proof that breastfeeding after breast cancer treatment increases the risk of recurrence. In fact, some research suggests having a history of breastfeeding might
actually lower the risk of the cancer coming back.

**How long after breast cancer treatment should I wait before becoming pregnant?**

If you want to have children, some doctors advise breast cancer survivors to wait at least 2 years after all treatment has finished before trying to get pregnant. The best length of time to wait is not clear, but 2 years is thought to be enough time to find any early return of the cancer, which could affect your decision to become pregnant. Keep in mind that this advice is not based on data from any clinical trials. And some breast cancers can come back after the 2-year mark, so every case is different. Your decision should be based on many things, including your age, desire for more pregnancies, type of breast cancer, and the risk of the cancer coming back early.

**If I get pregnant, would my history of breast cancer put my baby at risk?**

There is no proof that a woman’s past breast cancer has any direct effect on her baby. Researchers have found no increased rate of birth defects or other long-term health concerns in children born to women who have had breast cancer.

**Could breast cancer treatment affect my unborn baby?**

If you are still getting any type of treatment for breast cancer, including chemotherapy, hormone therapy, or targeted therapy, talk to your doctor before trying to become pregnant. These drugs could affect a growing fetus, so it is safer to wait until all treatment is complete before getting pregnant. It’s also important to remember that stopping treatment early can increase the risk of the cancer growing or coming back. See [Treating Breast Cancer During Pregnancy](#) for more on this.

**Can I breastfeed after breast cancer treatment?**

If you have had breast surgery and/or radiation, you may have problems breastfeeding from the affected breast. Studies have shown reduced milk production in that breast as well as structural changes that can make breastfeeding painful, or make it difficult for
the baby to latch onto the breast. Still, many women are able to breastfeed.

If you are still taking any medicines to treat your breast cancer (such as hormone therapy), it’s very important to talk with your doctor before trying to breastfeed. Some drugs can enter the breast milk and might affect the baby.

**Talk to your doctor**

If you have or have had breast cancer and are thinking about having children, talk with your doctor about how treatment could affect your chances for pregnancy. This discussion should also cover the risk of the cancer coming back. In many cases, counseling can help you sort through the choices that come with surviving breast cancer and planning a pregnancy.

- **References**
  


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**Follow up Care After Breast Cancer**
Treatment

Many women are relieved or excited to be finished with breast cancer treatment. But it can also be a time of worry for women who fear their cancer could come back, or who feel lost without the same frequency of visits with their cancer care team.

Even after you have completed breast cancer treatment, your doctors will want to watch you closely. It’s very important to go to all of your follow-up appointments. During these visits, your doctors will ask if you are having any problems. They may do exams and lab tests or imaging tests to look for signs of cancer or treatment side effects.

Almost any cancer treatment can have side effects. Some might only last for a few days or weeks, but others might last a long time. Some side effects might not even show up until years after you have finished treatment. Visits with your doctor are a good time for you to ask questions and talk about any changes or problems you notice or concerns you have. However, if you have additional concerns about your cancer, you do not have to wait until your next scheduled visit. You can call your doctor immediately.

Typical follow-up schedules

- **Doctor visits:** At first, your follow-up doctor visits will probably be scheduled for every few months. The longer you have been free of cancer, the less often the appointments are needed. After 5 years, they are typically done about once a year.
- **Mammograms:** If you had breast-conserving surgery, you will get a mammogram about 6-12 months after surgery and radiation are completed, and then at least every year after that. If you had a mastectomy you will still need to have yearly mammograms on the remaining breast.
- **Pelvic exams:** If you are taking either of the hormone drugs tamoxifen or toremifene and still have your uterus, you should have pelvic exams every year because these drugs can increase your risk of uterine cancer. This risk is highest in women who have gone through menopause. Be sure to tell your doctor right away about any unusual vaginal bleeding, such as vaginal bleeding or spotting after menopause, bleeding or spotting between periods, or a change in your periods. Although this is usually caused by something that isn’t cancer, it can also be the first sign of uterine cancer.
- **Bone density tests:** If you are taking an aromatase inhibitor (anastrozole, letrozole, or exemestane) for early stage breast cancer, or if you go through menopause as a result of treatment, your doctor will want to monitor your bone
health and may consider testing your bone density.

- **Other tests:** Other tests such as blood tests and imaging tests (like bone scans and chest x-rays) are not a standard part of follow-up because they haven’t been shown to help a woman treated for breast cancer live longer. But they might be done if you have symptoms or physical exam findings that suggest that the cancer might have come back. These and other tests may also be done as part of evaluating new treatments by clinical trials.

If symptoms, exams, or tests suggest a possible recurrence of your cancer, imaging tests such as an x-ray, CT scan, PET scan, MRI scan, bone scan, and/or a biopsy may be done. Your doctor may also look for circulating tumor cells in the blood or measure levels of blood tumor markers such as CA-15-3, CA 27-29, or CEA. The blood levels of tumor markers go up in some women if their cancer has spread to bones or other organs such as the liver. They are not elevated in all women with recurrence, so they aren't always helpful. If they are elevated, your doctor might use them to monitor the results of therapy.

It’s important to know that women who have had breast cancer can also still get other types of cancer. In fact, women who have had breast cancer are at higher risk for certain other cancers. Because of this, it’s important to follow the American Cancer Society guidelines for the early detection of cancer, such as those for colorectal cancer and cervical cancer. To learn more about the risks of second cancers and what you can do about them, see Second Cancers After Breast Cancer.

**Ask your doctor for a survivorship care plan**

Talk with your doctor about developing a survivorship care plan for you. This plan might include:

- A suggested schedule for follow-up exams and tests
- A schedule for other tests you might need in the future, such as early detection (screening) tests for other types of cancer, or tests to look for long-term health effects from your cancer or its treatment
- A list of possible late- or long-term side effects from your treatment, including what to watch for and when you should contact your doctor
- Diet and physical activity suggestions

**If the cancer comes back**
If cancer does return, your treatment options will depend on where it comes back, what treatments you've had before, and your current health and preferences. For more information on how recurrent cancer is treated, see Treatment of Recurrent Breast Cancer.

- **References**


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**Can I Lower My Risk of Breast Cancer Progressing or Coming Back?**

If you have (or have had) breast cancer, you probably want to know if there are things you can do that might lower your risk of the cancer growing or coming back, such as exercising, eating a certain type of diet, or taking nutritional supplements. Fortunately, breast cancer is one of the best studied types of cancer in this regard, and research has shown there are some things you can do that might be helpful.

Staying as healthy as possible is more important than ever after breast cancer treatment. Controlling your weight, exercising, and eating right may help you lower your risk of your breast cancer coming back, and may help protect you from other health problems.
Getting to a healthy weight

If you have had breast cancer, getting to and staying at a healthy weight might help lower your risk. A lot of research suggests that being overweight or obese (very overweight) raises the risk of breast cancer coming back. It has also been linked with a higher risk of getting lymphedema, as well as a higher risk of dying from breast cancer.

However, there is less research to show whether losing weight during or after treatment can actually lower the risk of breast cancer coming back. Large studies are now looking at this issue. This is complicated by the fact that many women gain weight (without trying) during breast cancer treatment, which itself might increase risk.

Of course, for women who are overweight, getting to a healthy weight can also have other health benefits. For example, weight loss has been shown to improve quality of life and physical functioning among overweight breast cancer survivors. Getting to a healthy weight might also lower your risk of getting some other cancers (including a new breast cancer), as well as some other chronic diseases.

Because of the possible health benefits of losing weight, many health care providers now encourage women who are overweight to get to and stay at a healthy weight. Still, it’s important to discuss this with your doctor before trying to lose weight, especially if you are still getting treatment or have just finished it. Your health care team can help you create a plan to lose weight safely.

Being physically active

Among breast cancer survivors, studies have found a consistent link between physical activity and a lower risk of breast cancer coming back and of dying from breast cancer. Physical activity has also been linked to improvements in quality of life, physical functioning, and fewer fatigue symptoms.

It’s not clear exactly how much activity might be needed, but more seems to be better. More vigorous activity may also be more helpful than less vigorous activity. But further studies are needed to follow up on these findings.

Some people used to think that breast cancer survivors with lymphedema should avoid certain arm exercises and vigorous activities. But studies have found that such physical activity is safe. In fact, it might actually lower the risk of lymphedema, or improve lymphedema for women who already have it.
As with other types of lifestyle changes, it’s important to talk with your treatment team before starting a new physical activity program. This will likely include meeting with a physical therapist as well. Your team can help you plan a program that can be both safe and effective for you.

**Eating a healthy diet**

Most research on possible links between diet and the risk of breast cancer coming back has looked at broad dietary patterns, rather than specific foods. In general, it’s not clear if eating any specific type of diet can help lower your risk of breast cancer coming back. Studies have found that breast cancer survivors who eat diets high in vegetables, fruits, whole grains, chicken, and fish tend to live longer than those who eat diets that have more refined sugars, fats, red meats (such as beef, pork, and lamb), and processed meats (such as bacon, sausage, luncheon meats, and hot dogs). But it’s not clear if this is due to effects on breast cancer or possibly to other health benefits of eating a healthy diet.

Two large studies (known as WINS and WHEL) have looked at the effects of lowering fat intake after being diagnosed with early stage breast cancer. One study found that women on a low-fat diet had a small reduction in the risk of cancer coming back, but these women had also lost weight as a result of their diet, which might have affected the results. The other study did not find a link between a diet low in fat and the risk of cancer coming back.

Many women have questions about whether soy products are safe to eat after a diagnosis of breast cancer. Soy foods are rich sources of compounds called isoflavones that can have estrogen-like properties in the body. However, some recent large studies have not found that soy food intake affects breast cancer coming back or survival rates. While eating soy foods doesn’t seem to pose a risk, the evidence regarding the effects of taking soy or isoflavone supplements is not as clear.

While the links between specific types of diets and breast cancer coming back are not certain, there are clearly health benefits to eating well. For example, diets that are rich in plant sources are often an important part of getting to and staying at a healthy weight. Eating a healthy diet can also help lower your risk for some other health problems, such as heart disease and diabetes.

**Dietary supplements**

Women often want to know if there are any dietary or nutritional supplements they can
take to help lower their risk. So far, no dietary supplements (including vitamins, minerals, and herbal products) have been shown to clearly help lower the risk of breast cancer progressing or coming back. This doesn’t mean that none will help, but it’s important to know that none have been proven to do so.

Dietary supplements are not regulated like medicines in the United States – they do not have to be proven effective (or even safe) before being sold, although there are limits on what they’re allowed to claim they can do. If you’re thinking about taking any type of nutritional supplement, talk to your health care team. They can help you decide which ones you can use safely while avoiding those that might be harmful.

Alcohol

It’s clear that alcohol – even as little as a few drinks a week – increases a woman’s risk of getting breast cancer. But whether alcohol affects the risk of breast cancer coming back is not as clear. Drinking alcohol can raise the levels of estrogen in the body, which in theory could increase the risk of breast cancer coming back. But there is no strong evidence from studies to support this.

As part of its guidelines on nutrition and physical activity for cancer prevention, the American Cancer Society recommends that women who drink alcohol limit their intake to no more than 1 drink a day to help lower their risk of getting certain types of cancer (including breast cancer). But for women who have completed cancer treatment, the effects of alcohol on cancer recurrence risk are largely unknown. This issue is complicated by the fact that low to moderate alcohol use (1 drink a day or less) has been linked with a lower risk of heart disease.

Because this issue is complex, it’s important to discuss it with your health care team, taking into account your risk of breast cancer coming back (or getting a new breast cancer), your risk of heart disease, and your risk of other health issues linked to alcohol use.

- References


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Second Cancers After Breast Cancer

Women who've had breast cancer can still get other cancers, although most don’t get cancer again. Breast cancer survivors are at higher risk for getting another breast cancer, as well as some other types of cancer. Steps for staying as healthy as possible include eating right, getting regular exercise, staying away from tobacco, and getting recommended screening tests.

Breast cancer survivors can be affected by a number of health problems, but often a major concern is facing cancer again. Cancer that comes back after treatment is called a recurrence. But some cancer survivors develop a new, unrelated cancer later. This is called a second cancer.

Women who have had breast cancer can get any type of second cancer, but they have a higher risk for certain types of cancer, including:

- A second breast cancer (This is different from the first cancer coming back.)
- Salivary gland cancer
- Esophagus cancer
- Stomach cancer
- Colon cancer
- Uterine cancer
- Ovarian cancer
- Thyroid cancer
- Soft tissue cancer (sarcoma)
- Melanoma of the skin
- Acute myeloid leukemia (AML)

The most common second cancer in survivors of breast cancer is another breast cancer. The new cancer can occur in the opposite breast, as well as in the same breast for women who were treated with breast-conserving surgery (such as a lumpectomy).

Cancers linked to genetic factors

For some second cancers, shared genetic risk factors may play a role. For example,
women with mutations in one of the *BRCA* genes have an increased risk breast cancer, ovarian cancer, and some other cancers.

**Cancers linked to radiation treatment**

**Lung cancer:** The risk of lung cancer is higher in women who had radiation therapy after a mastectomy as part of their treatment. The risk does not seem to be increased in women who have radiation therapy to the breast after a lumpectomy. The increased risk is first seen about 10 years after radiation and gets higher over time. The risk is even higher in women who smoke.

**Sarcoma:** Radiation therapy to the breast also increases the risk of sarcomas of blood vessels (angiosarcomas), bone (osteosarcomas), and other connective tissues in areas that were treated. Overall, this risk is low.

**Certain blood cancers:** Breast radiation is linked to a higher risk of leukemia and myelodysplastic syndrome. Overall, though, this risk is low.

**Cancers linked to chemotherapy**

There is a small increased risk of developing leukemia and myelodysplastic syndrome after receiving certain chemotherapy drugs (chemo) for early breast cancer. The risk is higher if both chemo and radiation therapy are given.

**Cancers linked to treatment with tamoxifen**

Taking [tamoxifen](https://www.cancer.gov/types/breast/hp/tamoxifen-pdq#section-2) lowers the chance of hormone receptor-positive breast cancer coming back. It also lowers the risk of a second breast cancer. Tamoxifen does, however, increase the risk for uterine cancer (endometrial cancer and uterine sarcoma). Still, the overall risk of uterine cancer in most women taking tamoxifen is low, and studies have shown that the benefits of this drug in treating breast cancer are greater than the risk of a second cancer.

**Follow-up after breast cancer treatment**

After completing treatment for breast cancer, you should still see your doctor regularly to look for signs that the cancer has come back. If you have not had both breasts removed, you need annual mammograms to look for breast cancer (either a recurrence of the cancer or a new breast cancer). See [Follow-up Care After Breast Cancer](https://www.cancer.gov/types/breast/hp/tamoxifen-pdq#section-2)
Treatment for more on the types of tests you might need after treatment.

You should also follow the American Cancer Society guidelines for the early detection of cancer, such as those for colorectal cancer and cervical cancer. Screening tests can often find these cancers early, when they are likely to be easier to treat. In some cases, the tests might even help prevent these cancers if pre-cancers are found and treated. For women who have had breast cancer, most experts do not recommend any additional testing to look for second cancers unless you have symptoms.

Let your doctor know about any new symptoms or problems, because they could be caused by the breast cancer coming back or by a new disease or second cancer. For example, abnormal menstrual bleeding, such as bleeding or spotting after menopause or between periods, can be a symptom of uterine cancer.

**Can I lower my risk of getting a second cancer?**

It’s not possible to prevent all cancers, but there are steps you can take to lower your risk and stay as healthy as possible. Getting the recommended early detection tests, as mentioned above, is one way to do this.

It’s also important to stay away from tobacco products. Smoking increases the risk of many cancers, including some of the second cancers seen after breast cancer.

To help maintain good health, breast cancer survivors should also:

- Get to and stay at a healthy weight
- Keep physically active
- Eat a healthy diet, with an emphasis on plant foods
- Limit alcohol to no more than 1 drink per day

These steps may also lower the risk of some other health problems.

See Second Cancers in Adults for more information about causes of second cancers.

**References**


Menopausal Hormone Therapy After Breast Cancer

Taking post-menopausal hormone therapy (PHT), also called hormone replacement therapy (HRT), to help with menopause symptoms may not be safe for women who have had breast cancer. If you are bothered by menopause symptoms, talk to your doctor about other ways to get help.

Many women have menopause symptoms such as hot flashes after treatment for breast
cancer. This can happen naturally as women get older, but it can also be caused by breast cancer treatment. Some pre-menopausal women have menopause symptoms as a result of chemotherapy or ovarian ablation. Some hormone therapy drugs used to treat breast cancer (such as tamoxifen and aromatase inhibitors) can also cause menopause symptoms. Women who are past menopause might also get symptoms if they had to stop taking PHT.

Can I take menopausal hormone therapy after breast cancer?

When women reach menopause, some choose to take PHT, which is made up of female hormones (estrogen, sometimes along with progesterone) to help reduce menopause symptoms. But doctors have been concerned about women who have had breast cancer using PHT, because of the known link between estrogen levels and breast cancer growth.

In the past, doctors often offered PHT after breast cancer treatment to women suffering from severe symptoms because early studies had shown no harm. But a well-designed clinical trial (the HABITS study) found that breast cancer survivors taking PHT were much more likely to develop a new or recurrent breast cancer (cancer that comes back after treatment) than women who were not taking the drugs. Most doctors now feel that if a woman was previously treated for breast cancer, taking PHT would be unwise.

Relieving menopausal symptoms without hormone therapy

If you are having trouble with menopause symptoms, talk to your doctor about other ways besides PHT to help with specific symptoms.

Soy products: Some doctors have suggested that phytoestrogens (estrogen-like substances from certain plant sources, such as soy products) may be safer than the estrogens used in PHT. Eating soy foods seems to be safe for breast cancer survivors and might be helpful for some women, although it’s not clear if it can help relieve menopause symptoms. Women can get higher doses of phytoestrogens in some dietary supplements (such as soy or isoflavone supplements). However, not enough information is available on these supplements to know for sure if they are safe and if they work. If you are considering taking one of these supplements, be sure to talk with your doctor.
**Non-hormone medicines:** Drugs without hormone properties that may be helpful in treating hot flashes include:

- The antidepressant venlafaxine (Effexor)
- The blood pressure drug clonidine
- The nerve drug gabapentin (Neurontin)

If you are taking tamoxifen, it's important to note that some antidepressants can interact with tamoxifen and could make it less effective. Ask your doctor about any possible interactions between tamoxifen and any drugs you are taking.

**Acupuncture:** Some research has suggested that acupuncture might be helpful in treating hot flashes. This might be another option to discuss with your doctor.

**References**


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