

Breast Cancer Treatment (PDQ®)–Patient Version

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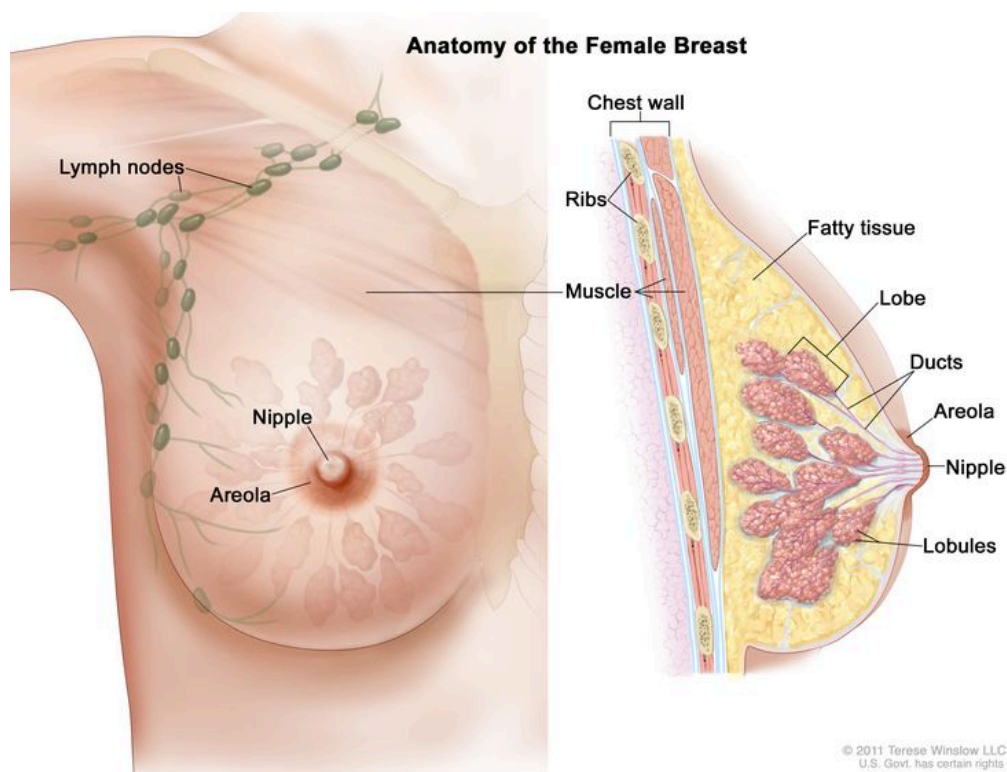
General Information About Breast Cancer

KEY POINTS

- Breast cancer is a disease in which malignant (cancer) cells form in the tissues of the breast.
- A family history of breast cancer and other factors increase the risk of breast cancer.
- Breast cancer is sometimes caused by inherited gene mutations (changes).
- The use of certain medicines and other factors decrease the risk of breast cancer.
- Signs of breast cancer include a lump or change in the breast.
- Tests that examine the breasts are used to diagnose breast cancer.
- If cancer is found, tests are done to study the cancer cells.
- Certain factors affect prognosis (chance of recovery) and treatment options.

Breast cancer is a disease in which malignant (cancer) cells form in the tissues of the breast.

The breast is made up of lobes and ducts. Each breast has 15 to 20 sections called lobes. Each lobe has many smaller sections called lobules. Lobules end in dozens of tiny bulbs that can make milk. The lobes, lobules, and bulbs are linked by thin tubes called ducts.

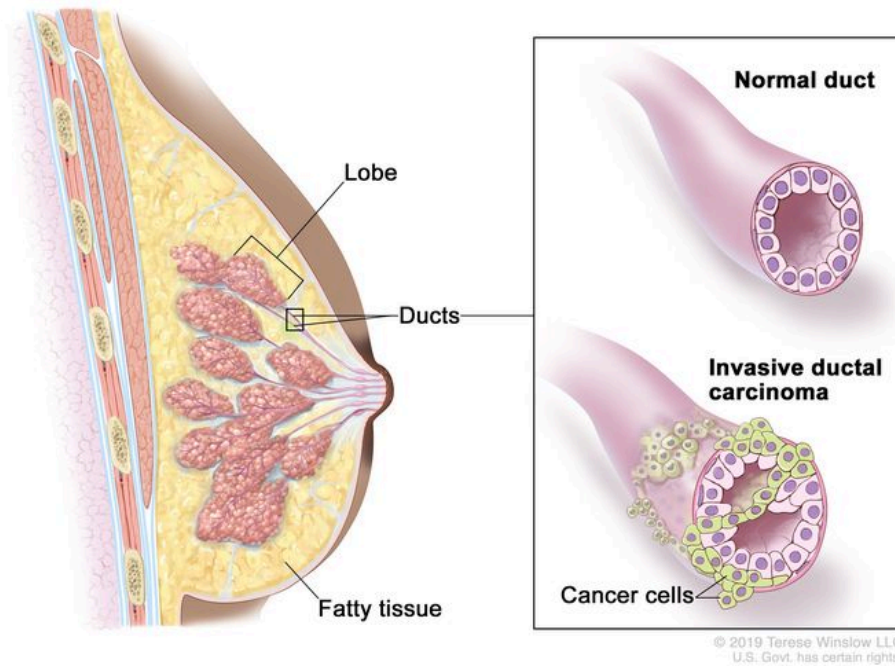


Anatomy of the female breast. The nipple and areola are shown on the outside of the breast. The lymph nodes, lobes, lobules, ducts, and other parts of the inside of the breast are also shown.

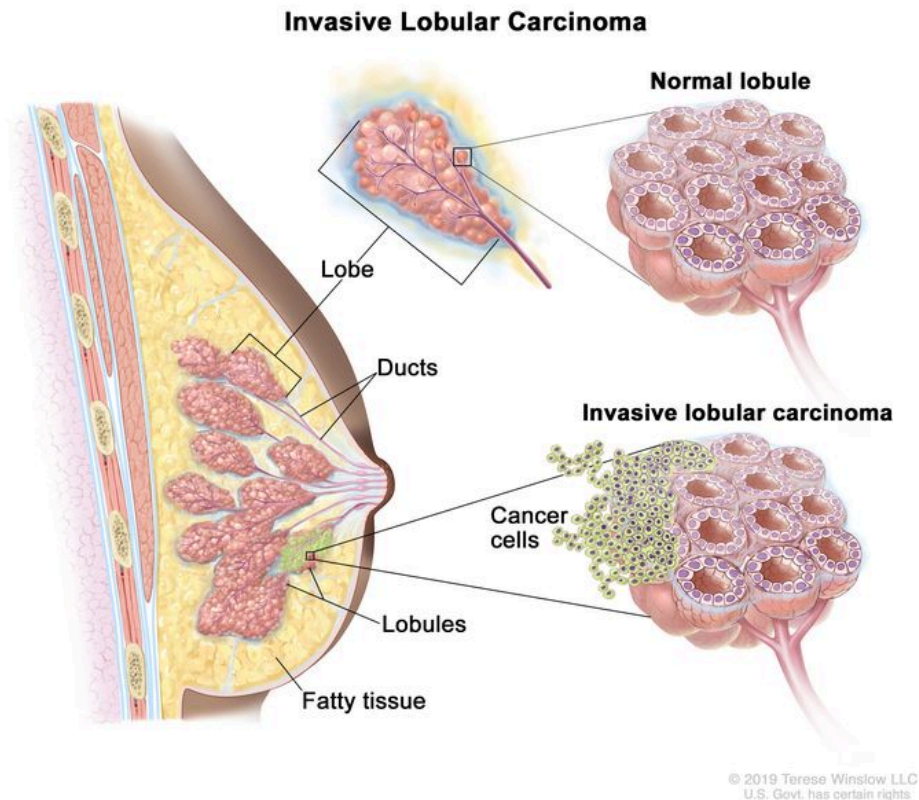
Each breast also has blood vessels and lymph vessels. The lymph vessels carry an almost colorless, watery fluid called lymph. Lymph vessels carry lymph between lymph nodes. Lymph nodes are small, bean-shaped structures found throughout the body. They filter lymph and store white blood cells that help fight infection and disease. Groups of lymph nodes are found near the breast in the axilla (under the arm), above the collarbone, and in the chest.

The most common type of breast cancer is ductal carcinoma, which begins in the cells of the ducts and makes up about 70% to 80% of all breast cancer cases. The second most common type of breast cancer is lobular carcinoma, which begins in the lobes or lobules and makes up 10% to 15% of all breast cancer cases. Lobular carcinoma is more often found in both breasts at the same time than are other types of breast cancer. Inflammatory breast cancer is a rare type of fast-growing breast cancer in which cancer cells block lymph vessels in the skin of the breast.

Invasive Ductal Carcinoma (IDC) of the Breast



Invasive ductal carcinoma (IDC) of the breast begins in the lining of a breast duct (milk duct) and spreads outside the duct to other tissues in the breast. It can also spread through the blood and lymph system to other parts of the body. IDC is the most common type of invasive breast cancer.



Invasive lobular carcinoma begins in the lobules (milk glands) of the breast and spreads outside the lobules to other tissues in the breast. It can also spread through the blood and lymph systems to other parts of the body.

For more information about breast cancer, see:

- [Breast Cancer Prevention](#)
- [Breast Cancer Screening](#)
- [Breast Cancer Treatment During Pregnancy](#)
- [Male Breast Cancer Treatment](#)
- [Childhood Breast Cancer Treatment](#)

A family history of breast cancer and other factors increase the risk of breast cancer.

Anything that increases your chance of getting a disease is called a risk factor. Having a risk factor does not mean that you will get cancer; not having risk factors doesn't mean that you will not get cancer. Talk to your doctor if you think you may be at risk for breast cancer.

Risk factors for breast cancer include the following:

- A personal history of invasive breast cancer, ductal carcinoma in situ (DCIS), or lobular carcinoma in situ (LCIS).
- A personal history of benign (noncancer) breast disease.
- A family history of breast cancer in a first-degree relative (mother, daughter, or sister).
- Inherited changes in the *BRCA1* or *BRCA2* genes or in other genes that increase the risk of breast cancer.
- Breast tissue that is dense on a mammogram.
- Exposure of breast tissue to estrogen made by the body. This may be caused by:
 - Menstruating at an early age.
 - Older age at first birth or never having given birth.
 - Starting menopause at a later age.
- Taking hormones such as estrogen combined with progestin for symptoms of menopause.
- Treatment with radiation therapy to the breast/chest.
- Drinking alcohol.
- Obesity.

Older age is the main risk factor for most cancers. The chance of getting cancer increases as you get older.

NCI's [Breast Cancer Risk Assessment Tool](#) uses a woman's risk factors to estimate her risk for breast cancer during the next five years and up to age 90. This online tool is meant to be used by a health care provider. For more information on breast cancer risk, call 1-800-4-CANCER.

Breast cancer is sometimes caused by inherited gene mutations (changes).

The genes in cells carry the hereditary information that is received from a person's parents. Hereditary breast cancer makes up about 5% to 10% of all breast cancer. Some mutated genes related to breast cancer are more common in certain ethnic groups.

Women who have certain gene mutations, such as a *BRCA1* or *BRCA2* mutation, have an increased risk of breast cancer. These women also have an increased risk of ovarian cancer, and may have an increased risk of other cancers. Men who have a mutated gene related to breast cancer also have an increased risk of breast cancer. For more information, see [Male Breast Cancer Treatment](#).

There are tests that can detect (find) mutated genes. These genetic tests are sometimes done for members of families with a high risk of cancer. For more information, see [Genetics](#)

The use of certain medicines and other factors decrease the risk of breast cancer.

Anything that decreases your chance of getting a disease is called a protective factor.

Protective factors for breast cancer include the following:

- Taking any of the following:
 - Estrogen-only hormone therapy after a hysterectomy.
 - Selective estrogen receptor modulators (SERMs).
 - Aromatase inhibitors.
- Less exposure of breast tissue to estrogen made by the body. This can be a result of:
 - Early pregnancy.
 - Breastfeeding.
- Getting enough exercise.
- Having any of the following procedures:
 - Mastectomy to reduce the risk of cancer.
 - Oophorectomy to reduce the risk of cancer.
 - Ovarian ablation.

Signs of breast cancer include a lump or change in the breast.

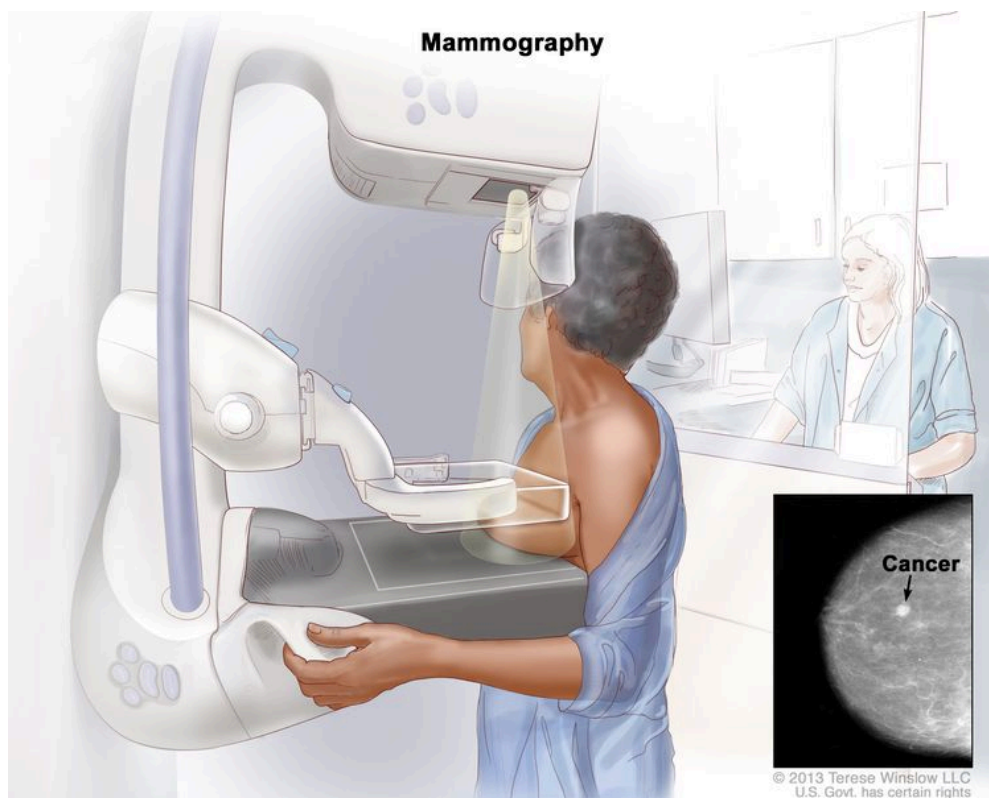
These and other signs may be caused by breast cancer or by other conditions. Check with your doctor if you have:

- A lump or thickening in or near the breast or in the underarm area.
- A change in the size or shape of the breast.
- A dimple or puckering in the skin of the breast.
- A nipple turned inward into the breast.
- Fluid, other than breast milk, from the nipple, especially if it's bloody.
- Scaly, red, or swollen skin on the breast, nipple, or areola (the dark area of skin around the nipple).
- Dimples in the breast that look like the skin of an orange, called peau d'orange.

Tests that examine the breasts are used to diagnose breast cancer.

Check with your doctor if you notice any changes in your breasts. The following tests and procedures may be used:

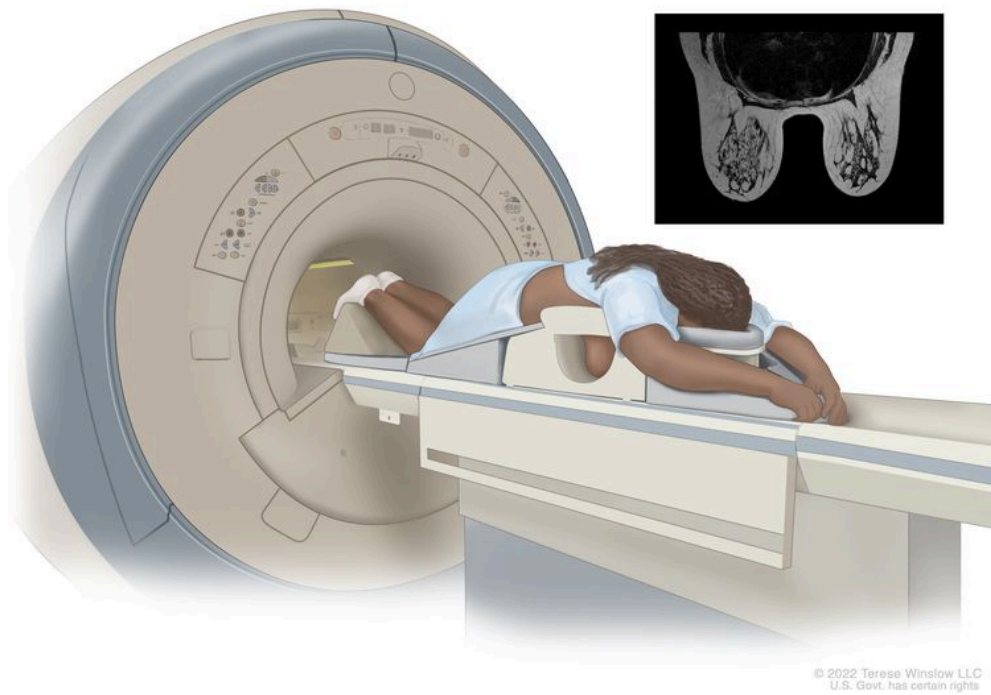
- **Physical exam and health history:** An exam of the body to check general signs of health, including checking for signs of disease, such as lumps or anything else that seems unusual. A history of the patient's health habits and past illnesses and treatments will also be taken.
- **Clinical breast exam (CBE):** An exam of the breast by a doctor or other health professional. The doctor will carefully feel the breasts and under the arms for lumps or anything else that seems unusual.
- **Mammogram:** An x-ray of the breast.



Mammography. The breast is pressed between two plates. X-rays are used to take pictures of breast tissue.

- **Ultrasound exam:** A procedure in which high-energy sound waves (ultrasound) are bounced off internal tissues or organs and make echoes. The echoes form a picture of body tissues called a sonogram. The picture can be printed to be looked at later.
- **MRI (magnetic resonance imaging):** A procedure that uses a magnet, radio waves, and a computer to make a series of detailed pictures of both breasts. This procedure is also called nuclear magnetic resonance imaging (NMRI).

MRI of the Breast



An MRI of the breast is a procedure that uses radio waves, a strong magnet, and a computer to create detailed pictures of the inside of the breast. A contrast dye may be injected into a vein (not shown) to make the breast tissues easier to see on the MRI pictures. An MRI may be used with other breast imaging tests to detect breast cancer or other abnormal changes in the breast. It may also be used to screen for breast cancer in some people who have a high risk of the disease. *Note: The inset shows an MRI image of the insides of both breasts. Credit for inset: The Cancer Imaging Archive (TCIA).*

- **Blood chemistry studies:** A procedure in which a blood sample is checked to measure the amounts of certain substances released into the blood by organs and tissues in the body. An unusual (higher or lower than normal) amount of a substance can be a sign of disease.
- **Biopsy:** The removal of cells or tissues so they can be viewed under a microscope by a pathologist to check for signs of cancer. If a lump in the breast is found, a biopsy may be done.

There are four types of biopsy used to check for breast cancer:

- **Excisional biopsy:** The removal of an entire lump of tissue.
- **Incisional biopsy:** The removal of part of a lump or a sample of tissue.
- **Core biopsy:** The removal of tissue using a wide needle.
- **Fine-needle aspiration (FNA) biopsy:** The removal of tissue or fluid, using a thin needle.

If cancer is found, tests are done to study the cancer cells.

Decisions about the best treatment are based on the results of these tests. The tests give information about:

- how quickly the cancer may grow.
- how likely it is that the cancer will spread through the body.
- how well certain treatments might work.
- how likely the cancer is to recur (come back).

Tests include:

- **Estrogen and progesterone receptor test:** A test to measure the amount of estrogen and progesterone (hormones) receptors in cancer tissue. If there are more estrogen and progesterone receptors than normal, the cancer is called estrogen and/or progesterone receptor positive. This type of breast cancer may grow more quickly. The test results show whether treatment to block estrogen and progesterone may stop the cancer from growing.
- **Human epidermal growth factor type 2 receptor (HER2/neu) test:** A laboratory test to measure how many HER2/neu genes there are and how much HER2/neu protein is made in a sample of tissue. If there are more HER2/neu genes or higher levels of HER2/neu protein than normal, the cancer is called HER2/neu positive or HER2 positive. This type of breast cancer may grow more quickly and is more likely to spread to other parts of the body. The cancer may be treated with drugs that target the HER2/neu protein, such as trastuzumab and pertuzumab.
- **Multigene tests:** Tests in which samples of tissue are studied to look at the activity of many genes at the same time. These tests may help predict whether cancer will spread to other parts of the body or recur (come back).

There are many types of multigene tests. The following multigene tests have been studied in clinical trials:

- **Oncotype DX:** This test helps predict whether early-stage breast cancer that is estrogen receptor positive and node negative will spread to other parts of the body. If the risk that the cancer will spread is high, chemotherapy may be given to lower the risk.
- **MammaPrint:** A laboratory test in which the activity of 70 different genes is looked at in the breast cancer tissue of women who have early-stage invasive breast cancer that has not spread to lymph nodes or has spread to 3 or fewer lymph nodes. The activity level of these genes helps predict whether breast cancer will spread to other parts of the body or come back. If the test shows that the risk that the cancer will spread or come back is high, chemotherapy may be given to lower the risk.

Based on these tests, breast cancer is described as one of the following types:

- Hormone receptor positive (estrogen and/or progesterone receptor positive) or hormone receptor negative (estrogen and/or progesterone receptor negative).
- HER2 positive or HER2 negative.
- Triple-negative (estrogen receptor, progesterone receptor, and HER2 negative).

This information helps the doctor decide which treatments will work best for your cancer.

Certain factors affect prognosis (chance of recovery) and treatment options.

The prognosis and treatment options depend on:

- The stage of the cancer (the size of the tumor and whether it is in the breast only or has spread to lymph nodes or other places in the body).
- The type of breast cancer.
- Estrogen receptor and progesterone receptor levels in the tumor tissue.
- Human epidermal growth factor type 2 receptor (HER2/neu) levels in the tumor tissue.
- Whether the tumor tissue is triple-negative (cells that do not have estrogen receptors, progesterone receptors, or high levels of HER2/neu).
- How fast the tumor is growing.
- How likely the tumor is to recur (come back).
- A woman's age, general health, and menopausal status (whether a woman is still having menstrual periods).
- Whether the cancer has just been diagnosed or has recurred (come back).

Stages of Breast Cancer

KEY POINTS

- After breast cancer has been diagnosed, tests are done to find out if cancer cells have spread within the breast or to other parts of the body.
- There are three ways that cancer spreads in the body.
- Cancer may spread from where it began to other parts of the body.
- In breast cancer, stage is based on the size and location of the primary tumor, the spread of cancer to nearby lymph nodes or other parts of the body, tumor grade, and whether certain biomarkers are present.

- The TNM system is used to describe the size of the primary tumor and the spread of cancer to nearby lymph nodes or other parts of the body.
 - Tumor (T). The size and location of the tumor.
 - Lymph Node (N). The size and location of lymph nodes where cancer has spread.
 - Metastasis (M). The spread of cancer to other parts of the body.
- The grading system is used to describe how quickly a breast tumor is likely to grow and spread.
- Biomarker testing is used to find out whether breast cancer cells have certain receptors.
- The TNM system, the grading system, and biomarker status are combined to find out the breast cancer stage.
- Talk to your doctor to find out what your breast cancer stage is and how it is used to plan the best treatment for you.
 - The treatment of breast cancer depends partly on the stage of the disease.

After breast cancer has been diagnosed, tests are done to find out if cancer cells have spread within the breast or to other parts of the body.

The process used to find out whether the cancer has spread within the breast or to other parts of the body is called staging. The information gathered from the staging process determines the stage of the disease. It is important to know the stage in order to plan treatment. The results of some of the tests used to diagnose breast cancer are also used to stage the disease. (See the [General Information](#) section.)

The following tests and procedures also may be used in the staging process:

- **Sentinel lymph node biopsy:** The removal of the sentinel lymph node during surgery. The sentinel lymph node is the first lymph node in a group of lymph nodes to receive lymphatic drainage from the primary tumor. It is the first lymph node the cancer is likely to spread to from the primary tumor. A radioactive substance and/or blue dye is injected near the tumor. The substance or dye flows through the lymph ducts to the lymph nodes. The first lymph node to receive the substance or dye is removed. A pathologist views the tissue under a microscope to look for cancer cells. If cancer cells are not found, it may not be necessary to remove more lymph nodes. Sometimes, a sentinel lymph node is found in more than one group of nodes.
- **Chest x-ray:** An x-ray of the organs and bones inside the chest. An x-ray is a type of energy beam that can go through the body and onto film, making a picture of areas inside the body.

- **CT scan (CAT scan):** A procedure that makes a series of detailed pictures of areas inside the body, taken from different angles. The pictures are made by a computer linked to an x-ray machine. A dye may be injected into a vein or swallowed to help the organs or tissues show up more clearly. This procedure is also called computed tomography, computerized tomography, or computerized axial tomography.
- **Bone scan:** A procedure to check if there are rapidly dividing cells, such as cancer cells, in the bone. A very small amount of radioactive material is injected into a vein and travels through the bloodstream. The radioactive material collects in the bones with cancer and is detected by a scanner.
- **PET scan (positron emission tomography scan):** A procedure to find malignant tumor cells in the body. A small amount of radioactive glucose (sugar) is injected into a vein. The PET scanner rotates around the body and makes a picture of where glucose is being used in the body. Malignant tumor cells show up brighter in the picture because they are more active and take up more glucose than normal cells do.

There are three ways that cancer spreads in the body.

Cancer can spread through tissue, the lymph system, and the blood:

- **Tissue.** The cancer spreads from where it began by growing into nearby areas.
- **Lymph system.** The cancer spreads from where it began by getting into the lymph system. The cancer travels through the lymph vessels to other parts of the body.
- **Blood.** The cancer spreads from where it began by getting into the blood. The cancer travels through the blood vessels to other parts of the body.

Cancer may spread from where it began to other parts of the body.

When cancer spreads to another part of the body, it is called metastasis. Cancer cells break away from where they began (the primary tumor) and travel through the lymph system or blood.

- **Lymph system.** The cancer gets into the lymph system, travels through the lymph vessels, and forms a tumor (metastatic tumor) in another part of the body.
- **Blood.** The cancer gets into the blood, travels through the blood vessels, and forms a tumor (metastatic tumor) in another part of the body.

The metastatic tumor is the same type of cancer as the primary tumor. For example, if breast cancer spreads to the bone, the cancer cells in the bone are actually breast cancer cells. The disease is metastatic breast cancer, not bone cancer.

Metastasis: How Cancer Spreads



Many cancer deaths are caused when cancer moves from the original tumor and spreads to other tissues and organs. This is called metastatic cancer. This animation shows how cancer cells travel from the place in the body where they first formed to other parts of the body.

In breast cancer, stage is based on the size and location of the primary tumor, the spread of cancer to nearby lymph nodes or other parts of the body, tumor grade, and whether certain biomarkers are present.

To plan the best treatment and understand your prognosis, it is important to know the breast cancer stage.

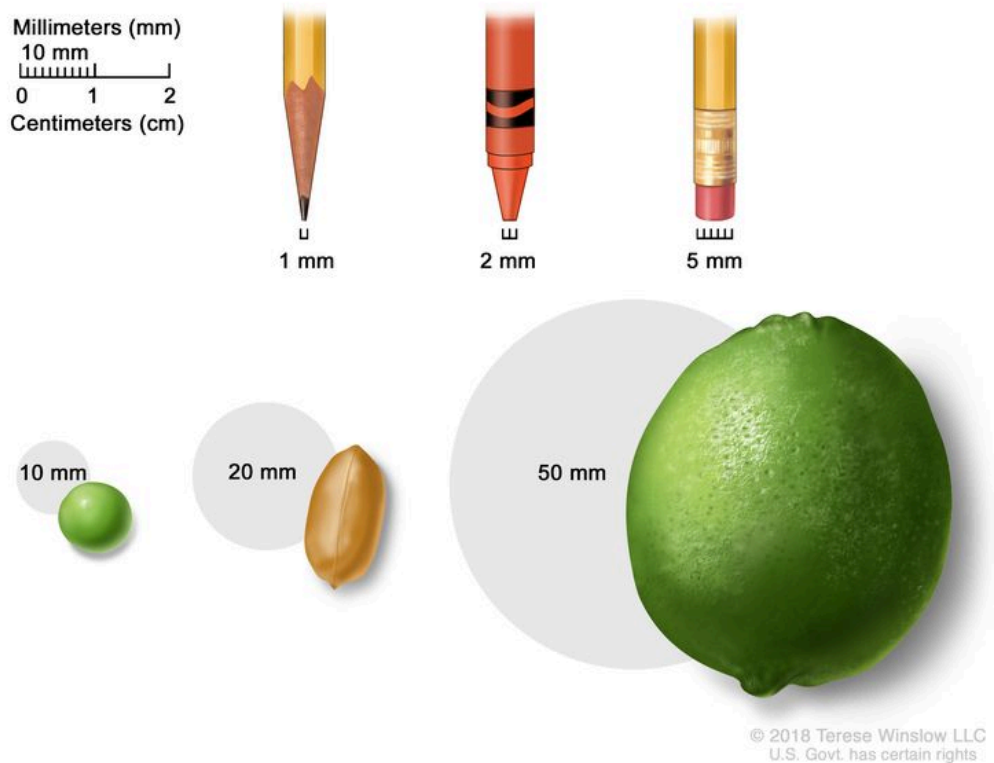
There are 3 types of breast cancer stage groups:

- **Clinical Prognostic Stage** is used first to assign a stage for **all** patients based on health history, physical exam, imaging tests (if done), and biopsies. The Clinical Prognostic Stage is described by the TNM system, tumor grade, and biomarker status (ER, PR, HER2). In clinical staging, mammography or ultrasound is used to check the lymph nodes for signs of cancer.
- **Pathological Prognostic Stage** is then used for patients who have surgery as their first treatment. The Pathological Prognostic Stage is based on all clinical information, biomarker status, and laboratory test results from breast tissue and lymph nodes removed during surgery.
- **Anatomic Stage** is based on the size and the spread of cancer as described by the TNM system. The Anatomic Stage is used in parts of the world where biomarker testing is not available. It is not used in the United States.

The TNM system is used to describe the size of the primary tumor and the spread of cancer to nearby lymph nodes or other parts of the body.

For breast cancer, the TNM system describes the tumor as follows:

Tumor (T). The size and location of the tumor.



Tumor sizes are often measured in millimeters (mm) or centimeters. Common items that can be used to show tumor size in mm include: a sharp pencil point (1 mm), a new crayon point (2 mm), a pencil-top eraser (5 mm), a pea (10 mm), a peanut (20 mm), and a lime (50 mm).

- TX: Primary tumor cannot be assessed.
- T0: No sign of a primary tumor in the breast.
- Tis: Carcinoma in situ. There are 2 types of breast carcinoma in situ:
 - Tis (DCIS): DCIS is a condition in which abnormal cells are found in the lining of a breast duct. The abnormal cells have not spread outside the duct to other tissues in the breast. In some cases, DCIS may become invasive breast cancer that is able to spread to other tissues. At this time, there is no way to know which lesions can become invasive.
 - Tis (Paget disease): Paget disease of the nipple is a condition in which abnormal cells are found in the skin cells of the nipple and may spread to the areola. It is not staged according to the TNM system. If Paget disease AND an invasive breast cancer are present, the TNM system is used to stage the invasive breast cancer.

- T1: The tumor is 20 millimeters or smaller. There are 4 subtypes of a T1 tumor depending on the size of the tumor:
 - T1mi: the tumor is 1 millimeter or smaller.
 - T1a: the tumor is larger than 1 millimeter but not larger than 5 millimeters.
 - T1b: the tumor is larger than 5 millimeters but not larger than 10 millimeters.
 - T1c: the tumor is larger than 10 millimeters but not larger than 20 millimeters.
- T2: The tumor is larger than 20 millimeters but not larger than 50 millimeters.
- T3: The tumor is larger than 50 millimeters.
- T4: The tumor is described as one of the following:
 - T4a: the tumor has grown into the chest wall.
 - T4b: the tumor has grown into the skin—an ulcer has formed on the surface of the skin on the breast, small tumor nodules have formed in the same breast as the primary tumor, and/or there is swelling of the skin on the breast.
 - T4c: the tumor has grown into the chest wall and the skin.
 - T4d: inflammatory breast cancer—one-third or more of the skin on the breast is red and swollen (called peau d'orange).

Lymph Node (N). The size and location of lymph nodes where cancer has spread.

When the lymph nodes are removed by surgery and studied under a microscope by a pathologist, pathologic staging is used to describe the lymph nodes. The pathologic staging of lymph nodes is described below.

- NX: The lymph nodes cannot be assessed.
- N0: No sign of cancer in the lymph nodes, or tiny clusters of cancer cells not larger than 0.2 millimeters in the lymph nodes.
- N1: Cancer is described as one of the following:
 - N1mi: cancer has spread to the axillary (armpit area) lymph nodes and is larger than 0.2 millimeters but not larger than 2 millimeters.
 - N1a: cancer has spread to 1 to 3 axillary lymph nodes and the cancer in at least one of the lymph nodes is larger than 2 millimeters.
 - N1b: cancer has spread to lymph nodes near the breastbone on the same side of the body as the primary tumor, and the cancer is larger than 0.2 millimeters and is found by sentinel lymph node biopsy. Cancer is not found in the axillary lymph nodes.
 - N1c: cancer has spread to 1 to 3 axillary lymph nodes and the cancer in at least one of the lymph nodes is larger than 2 millimeters. Cancer is also found by sentinel

lymph node biopsy in the lymph nodes near the breastbone on the same side of the body as the primary tumor.

- N2: Cancer is described as one of the following:
 - N2a: cancer has spread to 4 to 9 axillary lymph nodes and the cancer in at least one of the lymph nodes is larger than 2 millimeters.
 - N2b: cancer has spread to lymph nodes near the breastbone and the cancer is found by imaging tests. Cancer is not found in the axillary lymph nodes by sentinel lymph node biopsy or lymph node dissection.
- N3: Cancer is described as one of the following:
 - N3a: cancer has spread to 10 or more axillary lymph nodes and the cancer in at least one of the lymph nodes is larger than 2 millimeters, or cancer has spread to lymph nodes below the collarbone.
 - N3b: cancer has spread to 1 to 9 axillary lymph nodes and the cancer in at least one of the lymph nodes is larger than 2 millimeters. Cancer has also spread to lymph nodes near the breastbone and the cancer is found by imaging tests;

or

cancer has spread to 4 to 9 axillary lymph nodes and cancer in at least one of the lymph nodes is larger than 2 millimeters. Cancer has also spread to lymph nodes near the breastbone on the same side of the body as the primary tumor, and the cancer is larger than 0.2 millimeters and is found by sentinel lymph node biopsy.

- N3c: cancer has spread to lymph nodes above the collarbone on the same side of the body as the primary tumor.

When the lymph nodes are checked using mammography or ultrasound, it is called clinical staging. The clinical staging of lymph nodes is not described here.

Metastasis (M). The spread of cancer to other parts of the body.

- M0: There is no sign that cancer has spread to other parts of the body.
- M1: Cancer has spread to other parts of the body, most often the bones, lungs, liver, or brain. If cancer has spread to distant lymph nodes, the cancer in the lymph nodes is larger than 0.2 millimeters. The cancer is called metastatic breast cancer.

The grading system is used to describe how quickly a breast tumor is likely to grow and spread.

The grading system describes a tumor based on how abnormal the cancer cells and tissue look under a microscope and how quickly the cancer cells are likely to grow and spread. Low-grade cancer cells look more like normal cells and tend to grow and spread more

slowly than high-grade cancer cells. To describe how abnormal the cancer cells and tissue are, the pathologist will assess the following three features:

- How much of the tumor tissue has normal breast ducts.
- The size and shape of the nuclei in the tumor cells.
- How many dividing cells are present, which is a measure of how fast the tumor cells are growing and dividing.

For each feature, the pathologist assigns a score of 1 to 3; a score of “1” means the cells and tumor tissue look the most like normal cells and tissue, and a score of “3” means the cells and tissue look the most abnormal. The scores for each feature are added together to get a total score between 3 and 9.

Three grades are possible:

- Total score of 3 to 5: G1 (Low grade or well differentiated).
- Total score of 6 to 7: G2 (Intermediate grade or moderately differentiated).
- Total score of 8 to 9: G3 (High grade or poorly differentiated).

Biomarker testing is used to find out whether breast cancer cells have certain receptors.

Healthy breast cells, and some breast cancer cells, have receptors (biomarkers) that attach to the hormones estrogen and progesterone. These hormones are needed for healthy cells, and some breast cancer cells, to grow and divide. To check for these biomarkers, samples of tissue containing breast cancer cells are removed during a biopsy or surgery. The samples are tested in a laboratory to see whether the breast cancer cells have estrogen or progesterone receptors.

Another type of receptor (biomarker) that is found on the surface of all breast cancer cells is called HER2. HER2 receptors are needed for the breast cancer cells to grow and divide.

For breast cancer, biomarker testing includes:

- **Estrogen receptor (ER).** If the breast cancer cells have estrogen receptors, the cancer cells are called ER positive (ER+). If the breast cancer cells do not have estrogen receptors, the cancer cells are called ER negative (ER-).
- **Progesterone receptor (PR).** If the breast cancer cells have progesterone receptors, the cancer cells are called PR positive (PR+). If the breast cancer cells do not have progesterone receptors, the cancer cells are called PR negative (PR-).
- **Human epidermal growth factor type 2 receptor (HER2/neu or HER2).** If the breast cancer cells have larger than normal amounts of HER2 receptors on their surface, the cancer cells are called HER2 positive (HER2+). If the breast cancer cells have a normal

amount of HER2 on their surface, the cancer cells are called HER2 negative (HER2-).
HER2+ breast cancer is more likely to grow and divide faster than HER2- breast cancer.

Sometimes the breast cancer cells will be described as triple-negative or triple-positive.

- **Triple-negative.** If the breast cancer cells do not have estrogen receptors, progesterone receptors, or a larger than normal amount of HER2 receptors, the cancer cells are called triple-negative.
- **Triple-positive.** If the breast cancer cells do have estrogen receptors, progesterone receptors, and a larger than normal amount of HER2 receptors, the cancer cells are called triple-positive.

It is important to know the estrogen receptor, progesterone receptor, and HER2 receptor status to choose the best treatment. There are drugs that can stop the receptors from attaching to the hormones estrogen and progesterone and stop the cancer from growing. Other drugs may be used to block the HER2 receptors on the surface of the breast cancer cells and stop the cancer from growing.

The TNM system, the grading system, and biomarker status are combined to find out the breast cancer stage.

Here are 3 examples that combine the TNM system, the grading system, and the biomarker status to find out the Pathological Prognostic breast cancer stage for a woman whose first treatment was surgery:

If the tumor size is 30 millimeters (T2), has not spread to nearby lymph nodes (N0), has not spread to distant parts of the body (M0), and is:

- Grade 1
- HER2+
- ER-
- PR-

The cancer is stage IIA.

If the tumor size is 53 millimeters (T3), has spread to 4 to 9 axillary lymph nodes (N2), has not spread to other parts of the body (M0), and is:

- Grade 2
- HER2+
- ER+
- PR-

The tumor is stage IIIA.

If the tumor size is 65 millimeters (T3), has spread to 3 axillary lymph nodes (N1a), has spread to the lungs (M1), and is:

- Grade 1
- HER2+
- ER-
- PR-

The cancer is stage IV (metastatic breast cancer).

Talk to your doctor to find out what your breast cancer stage is and how it is used to plan the best treatment for you.

After surgery, your doctor will receive a pathology report that describes the size and location of the primary tumor, the spread of cancer to nearby lymph nodes, tumor grade, and whether certain biomarkers are present. The pathology report and other test results are used to determine your breast cancer stage.

You are likely to have many questions. Ask your doctor to explain how staging is used to decide the best options to treat your cancer and whether there are clinical trials that might be right for you.

The treatment of breast cancer depends partly on the stage of the disease.

For ductal carcinoma in situ (DCIS) treatment options, see [Treatment of Ductal Carcinoma in Situ](#).

For treatment options for stage I, stage II, stage IIIA, and operable stage IIIC breast cancer, see [Treatment of Early, Localized or Operable Breast Cancer](#).

For treatment options for stage IIIB, inoperable stage IIIC, and inflammatory breast cancer, see [Treatment of Locally Advanced Inflammatory Breast Cancer](#).

For treatment options for cancer that has recurred near the area where it first formed (such as in the breast, in the skin of the breast, in the chest wall, or in nearby lymph nodes), see [Treatment of Locoregional Recurrent Breast Cancer](#).

For treatment options for stage IV (metastatic) breast cancer or breast cancer that has recurred in distant parts of the body, see [Treatment of Metastatic Breast Cancer](#).

Inflammatory Breast Cancer

In inflammatory breast cancer, cancer has spread to the skin of the breast and the breast looks red and swollen and feels warm. The redness and warmth occur because the cancer cells block the lymph vessels in the skin. The skin of the breast may also show the dimpled appearance called peau d'orange (like the skin of an orange). There may not be any lumps in the breast that can be felt. Inflammatory breast cancer may be stage IIIB, stage IIIC, or stage IV.



Inflammatory breast cancer is a type of breast cancer in which the cancer cells block the lymph vessels in the skin of the breast. This causes the breast to look red and swollen. The skin may also appear dimpled or pitted, like the skin of an orange (peau d'orange), and the nipple may be inverted (facing inward).

Types of Treatment for Breast Cancer

KEY POINTS

- There are different types of treatment for patients with breast cancer.
- The following types of treatment are used:
 - Surgery
 - Radiation therapy
 - Chemotherapy
 - Hormone therapy
 - Targeted therapy

- Immunotherapy
- New types of treatment are being tested in clinical trials.
- Treatment for breast cancer may cause side effects.
- Follow-up care may be needed.

There are different types of treatment for patients with breast cancer.

You and your cancer care team will work together to decide your treatment plan, which may include more than one type of treatment. Many factors will be considered, such as the stage and grade of the cancer, whether certain biomarkers are present, your overall health, and your preferences. Your plan will include information about your cancer, the goals of treatment, your treatment options and the possible side effects, and the expected length of treatment.

Talking with your cancer care team before treatment begins about what to expect will be helpful. You'll want to learn what you need to do before treatment begins, how you'll feel while going through it, and what kind of help you will need. To learn more, see [Questions to Ask Your Doctor about Your Treatment](#).

The following types of treatment are used:

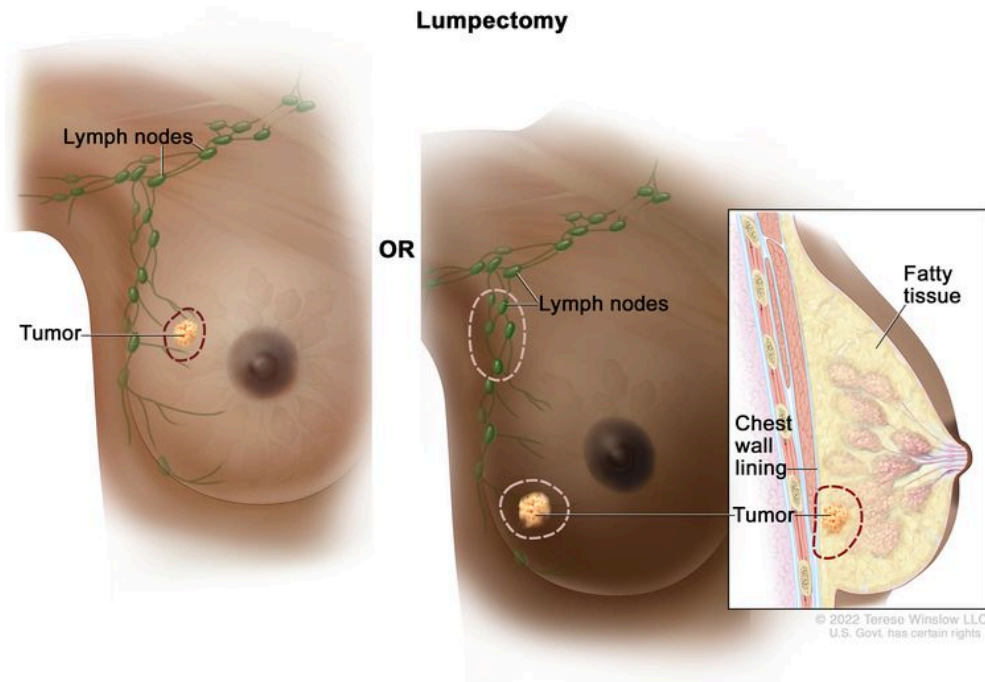
Surgery

Most patients with breast cancer have surgery to remove the cancer.

Sentinel lymph node biopsy is the removal of the sentinel lymph node during surgery. The sentinel lymph node is the first lymph node in a group of lymph nodes to receive lymphatic drainage from the primary tumor. It is the first lymph node the cancer is likely to spread to from the primary tumor. A radioactive substance and/or blue dye is injected near the tumor. The substance or dye flows through the lymph ducts to the lymph nodes. The first lymph node to receive the substance or dye is removed. A pathologist views the tissue under a microscope to look for cancer cells. If cancer cells are not found, it may not be necessary to remove more lymph nodes. Sometimes, a sentinel lymph node is found in more than one group of nodes. After the sentinel lymph node biopsy, the surgeon removes the tumor using breast-conserving surgery or mastectomy. If cancer cells were found, more lymph nodes will be removed through a separate incision (cut). This is called a lymph node dissection.

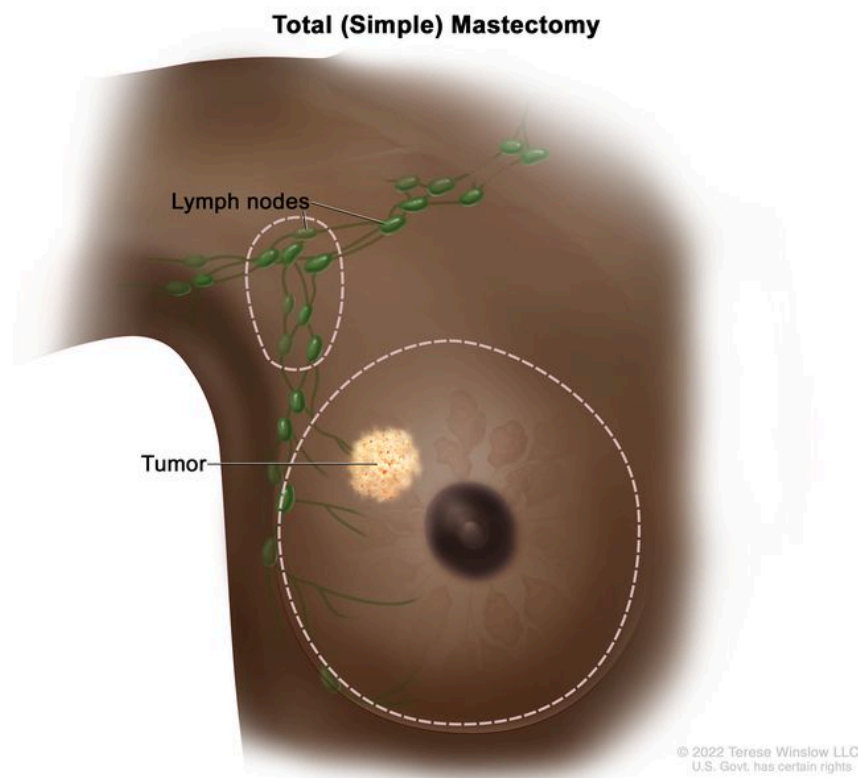
Types of surgery include:

- Breast-conserving surgery is an operation to remove the cancer and some normal tissue around it, but not the breast itself. Part of the chest wall lining may also be removed if the cancer is near it. This type of surgery may also be called lumpectomy, partial mastectomy, segmental mastectomy, quadrantectomy, or breast-sparing surgery.



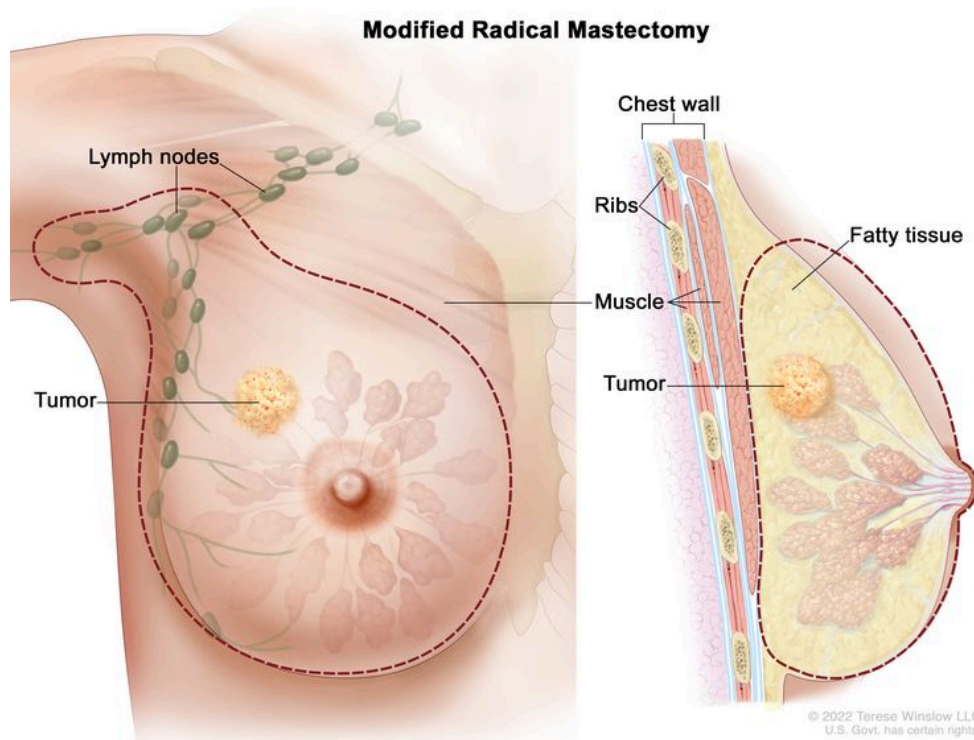
Lumpectomy. The tumor and some normal tissue around it are removed, but not the breast itself. Some lymph nodes under the arm may also be removed. If the cancer is near the chest wall, part of the chest wall lining may be removed as well.

- Total mastectomy is surgery to remove the whole breast that has cancer. This procedure is also called a simple mastectomy. Some of the lymph nodes under the arm may be removed and checked for cancer. This may be done at the same time as the breast surgery or after. This is done through a separate incision.



Total (simple) mastectomy. The whole breast is removed. Some of the lymph nodes under the arm may also be removed.

- Modified radical mastectomy is surgery to remove the whole breast that has cancer. This may include removal of the nipple, areola (the dark-colored skin around the nipple), and skin over the breast. Most of the lymph nodes under the arm are also removed.



Modified radical mastectomy. The whole breast and most of the lymph nodes under the arm are removed.

Chemotherapy may be given before surgery to remove the tumor. When given before surgery, chemotherapy will shrink the tumor and reduce the amount of tissue that needs to be removed during surgery. Treatment given before surgery is called preoperative therapy or neoadjuvant therapy.

After the doctor removes all the cancer that can be seen at the time of the surgery, some patients may be given radiation therapy, chemotherapy, targeted therapy, or hormone therapy after surgery, to kill any cancer cells that are left. Treatment given after the surgery, to lower the risk that the cancer will come back, is called postoperative therapy or adjuvant therapy.

If a patient is going to have a mastectomy, breast reconstruction (surgery to rebuild a breast's shape after a mastectomy) may be considered. Breast reconstruction may be done at the time of the mastectomy or at some time after. The reconstructed breast may be made with the patient's own (nonbreast) tissue or by using implants filled with saline or silicone gel. Before the decision to get an implant is made, patients can call the Food and

Drug Administration's (FDA) Center for Devices and Radiologic Health at 1-888-INFO-FDA (1-888-463-6332) or visit the [FDA website](#) for more information on breast implants.

Radiation therapy

Radiation therapy is a cancer treatment that uses high-energy x-rays or other types of radiation to kill cancer cells or keep them from growing. There are two types of radiation therapy:

- External radiation therapy uses a machine outside the body to send radiation toward the area of the body with cancer.
- Internal radiation therapy uses a radioactive substance sealed in needles, seeds, wires, or catheters that are placed directly into or near the cancer.

The way the radiation therapy is given depends on the type and stage of the cancer being treated. External radiation therapy is used to treat breast cancer. Internal radiation therapy with strontium-89 (a radionuclide) is used to relieve bone pain caused by breast cancer that has spread to the bones. Strontium-89 is injected into a vein and travels to the surface of the bones. Radiation is released and kills cancer cells in the bones.

Learn more about [Radiation to Treat Cancer](#) and [Radiation Therapy Side Effects](#).

Chemotherapy

Chemotherapy (also called chemo) uses drugs to stop the growth of cancer cells, either by killing the cells or by stopping them from dividing. Chemotherapy for breast cancer is usually systemic, meaning it is injected into a vein or given by mouth. When given this way, the drugs enter the bloodstream to reach cancer cells throughout the body.

To learn more about how chemotherapy works, how it is given, common side effects, and more, see [Chemotherapy to Treat Cancer](#) and [Chemotherapy and You: Support for People With Cancer](#).

Learn more about [Drugs Approved for Breast Cancer](#).

Hormone therapy

Hormone therapy (also called endocrine therapy) slows or stops the growth of hormone-sensitive tumors by blocking the body's ability to produce hormones or by interfering with the effects of hormones on breast cancer cells. Hormones are substances made by glands in the body and circulated in the bloodstream. Some hormones can cause certain cancers to grow. If tests show that the cancer cells have places where hormones can attach (receptors), drugs, surgery, or radiation therapy is used to reduce the production of hormones or block them from working. This is called ovarian ablation.

Types of hormone therapy for breast cancer include:

- aromatase inhibitor therapy (such as [anastrozole](#), [letrozole](#), or [exemestane](#))
- [fulvestrant](#)
- [elacestrant](#)
- luteinizing hormone-releasing hormone (LHRH) agonist therapy (such as [goserelin](#) or [leuprolide](#))
- [megestrol acetate](#)
- [tamoxifen](#)

Learn more about [Hormone Therapy for Breast Cancer](#).

Targeted therapy

Targeted therapy uses drugs or other substances to identify and attack specific cancer cells. Your doctor may suggest biomarker tests to help predict your response to certain targeted therapy drugs. Learn more about [Biomarker Testing for Cancer Treatment](#). Several types of targeted therapy are used to treat breast cancer.

- Monoclonal antibodies are immune system proteins made in the laboratory to treat many diseases, including cancer. As a cancer treatment, these antibodies can attach to a specific target on cancer cells or other cells that may help cancer cells grow. The antibodies are able to then kill the cancer cells, block their growth, or keep them from spreading. Monoclonal antibodies are given by infusion. They may be used alone or to carry drugs, toxins, or radioactive material directly to cancer cells. Monoclonal antibodies may be used in combination with chemotherapy as adjuvant therapy.

Monoclonal antibodies used to treat breast cancer include:

- [margetuximab](#)
- [pertuzumab](#)
- [sacituzumab govitecan](#)
- [trastuzumab](#)
- [trastuzumab deruxtecan](#)

How Monoclonal Antibodies Treat Cancer



How do monoclonal antibodies work to treat cancer? This video shows how monoclonal antibodies, such as trastuzumab, pembrolizumab, and rituximab, block molecules cancer cells need to grow, flag cancer cells for destruction by the body's immune system, or deliver harmful substances to cancer cells.

- Tyrosine kinase inhibitors block signals needed for tumors to grow. Tyrosine kinase inhibitors may be used with other anticancer drugs as adjuvant therapy. Tyrosine kinase inhibitors used to treat HER2-positive breast cancer include:
 - [lapatinib](#)
 - [neratinib](#)
 - [tucatinib](#)
- Cyclin-dependent kinase inhibitors block proteins called cyclin-dependent kinases, which cause the growth of cancer cells. CDK inhibitors may be given with hormone therapy, such as [fulvestrant](#) or [letrozole](#), to treat hormone receptor-positive, HER2-negative breast cancer. CDK inhibitors used to treat breast cancer include:
 - [abemaciclib](#)
 - [alpelisib](#)
 - [palbociclib](#)
 - [ribociclib](#)
- Mammalian target of rapamycin (mTOR) inhibitors block a protein called mTOR, which may keep cancer cells from growing and prevent the growth of new blood vessels that tumors need to grow. mTOR inhibitors used to treat HER2-negative breast cancer that is hormone receptor positive include:
 - [everolimus](#)
- PARP inhibitors block DNA repair and may cause cancer cells to die. PARP inhibitors used to treat HER2-negative breast cancer with mutations in the *BRCA1* or *BRCA2* gene

and include:

- [olaparib](#)
- [talazoparib](#)

Learn more about [Targeted Therapy to Treat Cancer](#).

Immunotherapy

Immunotherapy helps a person's immune system fight cancer. Your doctor may suggest biomarker tests to help predict your response to certain immunotherapy drugs. Learn more about [Biomarker Testing for Cancer Treatment](#).

Immune checkpoint inhibitors are a type of immunotherapy used to treat breast cancer:

- Immune checkpoint inhibitors block proteins called checkpoints that are made by some types of immune system cells, such as T cells, and some cancer cells. These checkpoints help keep immune responses from being too strong and sometimes can keep T cells from killing cancer cells. When these checkpoints are blocked, T cells can kill cancer cells better. Immune checkpoint inhibitors used to treat breast cancer include:

- [pembrolizumab](#)

This drug works in more than one way to kill cancer cells. It is also considered targeted therapy because it targets specific changes or substances in cancer cells.



Immunotherapy uses the body's immune system to fight cancer. This animation explains one type of immunotherapy that uses immune checkpoint inhibitors to treat cancer.

Learn more about [Immunotherapy to Treat Cancer](#) and [Immunotherapy Side Effects](#).

New types of treatment are being tested in clinical trials.

For some people, joining a clinical trial may be an option. There are different types of clinical trials for people with cancer. For example, a treatment trial tests new treatments or new ways of using current treatments. Supportive care and palliative care trials look at ways to improve quality of life, especially for those who have side effects from cancer and its treatment.

You can use the [clinical trial search](#) to find NCI-supported cancer clinical trials accepting participants. The search allows you to filter trials based on the type of cancer, your age, and where the trials are being done. Clinical trials supported by other organizations can be found on the [ClinicalTrials.gov](#) website.

Learn more about clinical trials, including how to find and join one, at [Clinical Trials Information for Patients and Caregivers](#).

Treatment for breast cancer may cause side effects.

To learn more about side effects that begin during treatment for cancer, visit [Side Effects](#).

Some treatments for breast cancer may cause side effects that continue or appear months or years after treatment has ended. These are called late effects.

Late effects of radiation therapy are not common, but may include:

- Inflammation of the lung after radiation therapy to the breast, especially when chemotherapy is given at the same time.
- Arm lymphedema, especially when radiation therapy is given after lymph node dissection. For more information, see [Lymphedema](#).
- In women younger than 45 years who receive radiation therapy to the chest wall after mastectomy, there may be a higher risk of developing breast cancer in the other breast.

Late effects of chemotherapy depend on the drugs used, but may include:

- heart failure.
- blood clots.
- premature menopause.
- a second cancer, such as leukemia.

Late effects of targeted therapy with trastuzumab, lapatinib, or pertuzumab may include:

- heart problems, such as heart failure.

Follow-up care may be needed.

Some of the tests that were done to [diagnose](#) or [stage](#) the cancer may be repeated to see how well the treatment is working. Decisions about whether to continue, change, or stop treatment may be based on the results of these tests. These tests are sometimes called follow-up tests or check-ups.

Treatment of Early, Localized, or Operable Breast Cancer

For information about the treatments listed below, see the [Treatment Option Overview](#) section.

Treatment of early, localized, or operable breast cancer may include:

Surgery

- Breast-conserving surgery and sentinel lymph node biopsy. If cancer is found in the lymph nodes, a lymph node dissection may be done.
- Modified radical mastectomy. Breast reconstruction may also be done.

Postoperative radiation therapy

For women who had breast-conserving surgery, radiation therapy is given to the whole breast to lessen the chance the cancer will come back. Radiation therapy may also be given to lymph nodes in the area.

For women who had a modified radical mastectomy, radiation therapy may be given to lessen the chance the cancer will come back if any of the following are true:

- Cancer was found in 4 or more lymph nodes.
- Cancer had spread to tissue around the lymph nodes.
- The tumor was large.
- There is tumor close to or remaining in the tissue near the edges of where the tumor was removed.

Postoperative systemic therapy

Systemic therapy is the use of drugs that can enter the bloodstream and reach cancer cells throughout the body. Postoperative systemic therapy is given to lessen the chance the cancer will come back after surgery to remove the tumor.

Postoperative systemic therapy is given depending on whether:

- The tumor is hormone receptor negative or positive.

- The tumor is HER2 negative or positive.
- The tumor is hormone receptor negative and HER2 negative (triple-negative).
- The size of the tumor.

In premenopausal women with hormone receptor positive tumors, no more treatment may be needed, or postoperative therapy may include:

- Tamoxifen therapy with or without chemotherapy.
- Tamoxifen therapy and treatment to stop or lessen how much estrogen is made by the ovaries. Drug therapy, surgery to remove the ovaries, or radiation therapy to the ovaries may be used.
- Aromatase inhibitor therapy and treatment to stop or lessen how much estrogen is made by the ovaries. Drug therapy, surgery to remove the ovaries, or radiation therapy to the ovaries may be used.

In postmenopausal women with hormone receptor positive tumors, no more treatment may be needed, or postoperative therapy may include:

- Aromatase inhibitor therapy with or without chemotherapy.
- Tamoxifen followed by aromatase inhibitor therapy, with or without chemotherapy.

In women with hormone receptor negative tumors, no more treatment may be needed, or postoperative therapy may include chemotherapy.

In women with HER2 negative tumors, postoperative therapy may include chemotherapy.

In women with small, HER2 positive tumors, and no cancer in the lymph nodes, no more treatment may be needed. If there is cancer in the lymph nodes, or the tumor is large, postoperative therapy may include:

- Chemotherapy and targeted therapy (trastuzumab).
- Hormone therapy, such as tamoxifen or aromatase inhibitor therapy, for tumors that are also hormone receptor positive.

In women with small, hormone receptor negative and HER2 negative tumors (triple-negative) and no cancer in the lymph nodes, no more treatment may be needed. If there is cancer in the lymph nodes or the tumor is large, postoperative therapy may include:

- Chemotherapy.
- Radiation therapy.
- PARP inhibitor therapy for women with an inherited *BRCA1* or *BRCA2* mutation.
- A clinical trial of a new chemotherapy regimen.

Preoperative systemic therapy

Systemic therapy is the use of drugs that can enter the bloodstream and reach cancer cells throughout the body. Preoperative systemic therapy is given to shrink the tumor before surgery.

Preoperative chemotherapy may make breast-sparing surgery possible in patients who are not eligible otherwise. Preoperative chemotherapy may also lessen the need for lymph node dissection in patients with disease that has spread to the lymph nodes.

In postmenopausal women with hormone receptor positive tumors, preoperative therapy may include:

- Chemotherapy.
- Hormone therapy, such as tamoxifen or aromatase inhibitor therapy, for women who cannot have chemotherapy.

In premenopausal women with hormone receptor positive tumors, preoperative therapy may include a clinical trial of hormone therapy, such as tamoxifen or aromatase inhibitor therapy.

In women with HER2-positive tumors, preoperative therapy may include:

- Chemotherapy and targeted therapy (trastuzumab).
- Targeted therapy (pertuzumab).

In women with HER2-negative tumors or triple-negative tumors, preoperative therapy may include chemotherapy.

For patients with triple-negative or HER2-positive disease, the response to preoperative therapy may be used as a guide in choosing the best treatment after surgery.

Use our [clinical trial search](#) to find NCI-supported cancer clinical trials that are accepting patients. You can search for trials based on the type of cancer, the age of the patient, and where the trials are being done. [General information](#) about clinical trials is also available.

Treatment of Locally Advanced or Inflammatory Breast Cancer

For information about the treatments listed below, see the [Treatment Option Overview](#) section.

Treatment of locally advanced or inflammatory breast cancer is a combination of therapies that may include:

- Surgery (breast-conserving surgery or total mastectomy) with lymph node dissection.
- Chemotherapy before and/or after surgery.
- Radiation therapy after surgery.
- Hormone therapy after surgery for tumors that are estrogen receptor positive or estrogen receptor unknown.
- Targeted therapy (trastuzumab and pertuzumab).
- Clinical trials testing new anticancer drugs, new drug combinations, and new ways of giving treatment.

Use our [clinical trial search](#) to find NCI-supported cancer clinical trials that are accepting patients. You can search for trials based on the type of cancer, the age of the patient, and where the trials are being done. [General information](#) about clinical trials is also available.

Treatment of Locoregional Recurrent Breast Cancer

For information about the treatments listed below, see the [Treatment Option Overview](#) section.

Treatment of locoregional recurrent breast cancer (cancer that has come back after treatment in the breast, in the chest wall, or in nearby lymph nodes), may include:

- Chemotherapy.
- Hormone therapy for tumors that are hormone receptor positive.
- Radiation therapy.
- Surgery.
- Targeted therapy (trastuzumab and pertuzumab).
- A clinical trial of a new treatment.

For information about treatment options for breast cancer that has spread to parts of the body outside the breast, chest wall, or nearby lymph nodes, see the [Treatment of Metastatic Breast Cancer](#) section.

Use our [clinical trial search](#) to find NCI-supported cancer clinical trials that are accepting patients. You can search for trials based on the type of cancer, the age of the patient, and where the trials are being done. [General information](#) about clinical trials is also available.

Treatment of Metastatic Breast Cancer

For information about the treatments listed below, see the [Treatment Option Overview](#) section.

Treatment options for metastatic breast cancer (cancer that has spread to distant parts of the body) may include:

Hormone therapy

In postmenopausal women who have just been diagnosed with metastatic breast cancer that is hormone receptor positive or if the hormone receptor status is not known, treatment may include:

- Tamoxifen therapy.
- Aromatase inhibitor therapy (anastrozole, letrozole, or exemestane). Sometimes cyclin-dependent kinase inhibitor therapy (palbociclib, ribociclib, abemaciclib, or alpelisib) is also given.
- PARP inhibitor therapy for women with an inherited *BRCA1* or *BRCA2* mutation.

In premenopausal women who have just been diagnosed with metastatic breast cancer that is hormone receptor positive, treatment may include:

- Tamoxifen, an LHRH agonist, or both.
- Cyclin-dependent kinase inhibitor therapy (ribociclib).

In women whose tumors are hormone receptor positive or hormone receptor unknown, with spread to the bone or soft tissue only, and who have been treated with tamoxifen, treatment may include:

- Aromatase inhibitor therapy.
- Other hormone therapy such as megestrol acetate, estrogen or androgen therapy, or anti-estrogen therapy such as fulvestrant or elacestrant.

Targeted therapy

In women with metastatic breast cancer that is hormone receptor positive and has not responded to other treatments, options may include targeted therapy such as:

- Trastuzumab, lapatinib, pertuzumab, or mTOR inhibitors.
- Cyclin-dependent kinase inhibitor therapy (palbociclib, ribociclib, or abemaciclib), which may be combined with hormone therapy.

In women with metastatic breast cancer that is HER2 positive, treatment may include:

- Targeted therapy such as trastuzumab, trastuzumab deruxtecan, pertuzumab, margetuximab, or lapatinib.
- Targeted therapy with tucatinib, a tyrosine kinase inhibitor used with trastuzumab and capecitabine.

In women with metastatic breast cancer that is HER2 negative, with mutations in the *BRCA1* or *BRCA2* genes, and who have been treated with chemotherapy, treatment may include targeted therapy with a PARP inhibitor (olaparib or talazoparib).

Chemotherapy

In women with metastatic breast cancer that has not responded to hormone therapy, has spread to other organs, or has caused symptoms, treatment may include chemotherapy with one or more drugs.

Chemotherapy and immunotherapy

In women with locally recurrent, inoperable, or metastatic triple-negative breast tumors which express PD-L1, treatment may include chemotherapy and immunotherapy (pembrolizumab).

Surgery

- Total mastectomy for women with open or painful breast lesions. Radiation therapy may be given after surgery.
- Surgery to remove cancer that has spread to the brain or spine. Radiation therapy may be given after surgery.
- Surgery to remove cancer that has spread to the lung.
- Surgery to repair or help support weak or broken bones. Radiation therapy may be given after surgery.
- Surgery to remove fluid that has collected around the lungs or heart.

Radiation therapy

- Radiation therapy to the bones, brain, spinal cord, breast, or chest wall to relieve symptoms and improve quality of life.
- Strontium-89 (a radionuclide) to relieve pain from cancer that has spread to bones throughout the body.

Other treatment options

Other treatment options for metastatic breast cancer include:

- Drug therapy with bisphosphonates or denosumab to reduce bone disease and pain when cancer has spread to the bone. For information about bisphosphonates, see [Cancer Pain](#).
- Antibody-drug conjugate therapy with sacituzumab govitecan for certain patients with metastatic triple-negative breast cancer. Sacituzumab govitecan is also approved for certain patients with metastatic hormone receptor positive and HER2-negative breast cancer.
- A clinical trial of high-dose chemotherapy with stem cell transplant.
- Clinical trials testing new anticancer drugs, new drug combinations, and new ways of giving treatment.

Use our [clinical trial search](#) to find NCI-supported cancer clinical trials that are accepting patients. You can search for trials based on the type of cancer, the age of the patient, and where the trials are being done. [General information](#) about clinical trials is also available.

Treatment of Ductal Carcinoma In Situ (DCIS)

For information about the treatments listed below, see the [Treatment Option Overview](#) section.

Treatment of ductal carcinoma in situ may include:

- Breast-conserving surgery and radiation therapy, with or without tamoxifen.
- Total mastectomy with or without tamoxifen. Radiation therapy may also be given.

Use our [clinical trial search](#) to find NCI-supported cancer clinical trials that are accepting patients. You can search for trials based on the type of cancer, the age of the patient, and where the trials are being done. [General information](#) about clinical trials is also available.

To Learn More About Breast Cancer

For more information from the National Cancer Institute about breast cancer, see:

- [Breast Cancer Home Page](#)
- [Surgery Choices for Women with DCIS or Breast Cancer](#)
- [Surgery to Reduce the Risk of Breast Cancer](#)
- [Breast Reconstruction After Mastectomy](#)
- [Sentinel Lymph Node Biopsy](#)

Male Breast Cancer Treatment (PDQ®)–Patient Version

[Go to Health Professional Version](#)

General Information about Male Breast Cancer

KEY POINTS

- Male breast cancer is a disease in which malignant (cancer) cells form in the tissues of the breast.
- A family history of breast cancer and other factors can increase a man's risk of breast cancer.
- Male breast cancer is sometimes caused by inherited gene mutations (changes).
- Men with breast cancer usually have lumps that can be felt.
- Tests that examine the breasts are used to diagnose breast cancer in men.
- If cancer is found, tests are done to study the cancer cells.
- Survival for men with breast cancer is similar to survival for women with breast cancer.
- Certain factors affect prognosis (chance of recovery) and treatment options.

Male breast cancer is a disease in which malignant (cancer) cells form in the tissues of the breast.

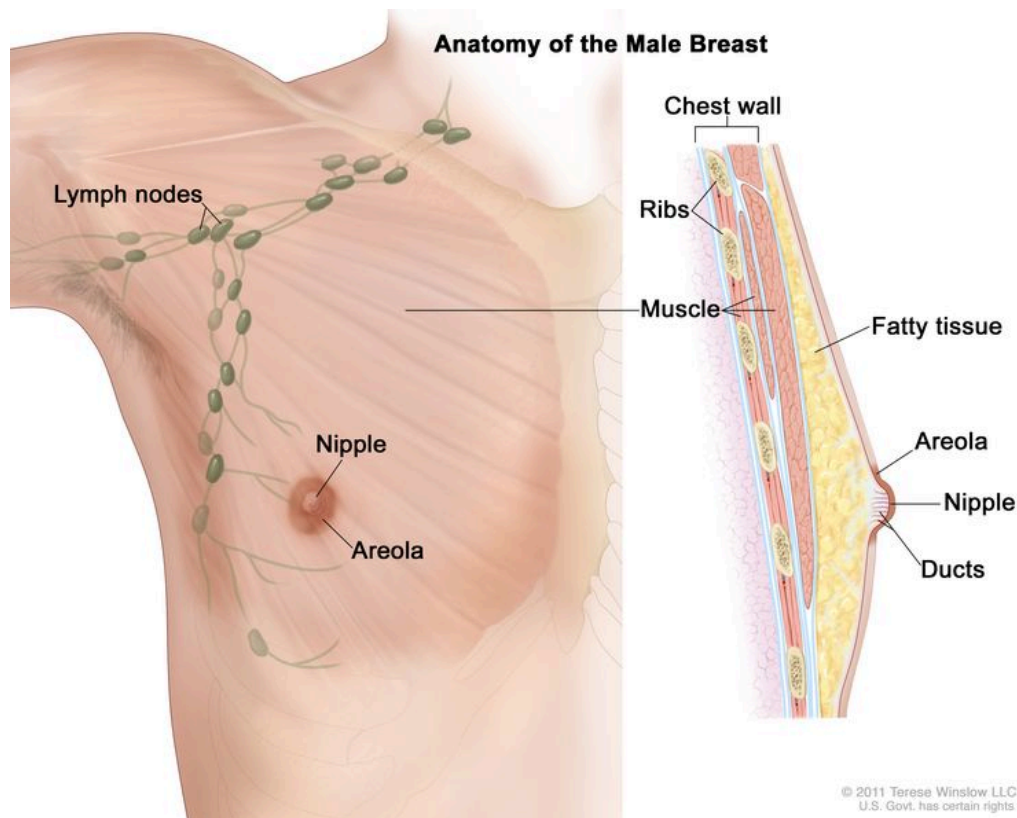
Breast cancer may occur in men. Breast cancer may occur in men at any age, but it usually occurs in men between 60 and 70 years of age. Male breast cancer makes up less than 1% of all cases of breast cancer.

The following types of breast cancer are found in men:

- Infiltrating ductal carcinoma: Cancer that has spread beyond the cells lining ducts in the breast. This is the most common type of breast cancer in men.
- Ductal carcinoma in situ: Abnormal cells that are found in the lining of a duct; also called intraductal carcinoma.
- Inflammatory breast cancer: A type of cancer in which the breast looks red and swollen and feels warm.

- Paget disease of the nipple: A tumor that has grown from ducts beneath the nipple onto the surface of the nipple.

Lobular carcinoma in situ (abnormal cells found in one of the lobes or sections of the breast), which sometimes occurs in women, has not been seen in men.



Anatomy of the male breast. The nipple and areola are shown on the outside of the breast. The lymph nodes, fatty tissue, ducts, and other parts of the inside of the breast are also shown.

A family history of breast cancer and other factors can increase a man's risk of breast cancer.

Anything that increases your risk of getting a disease is called a risk factor. Having a risk factor does not mean that you will get cancer; not having risk factors doesn't mean that you will not get cancer. Talk with your doctor if you think you may be at risk. Risk factors for breast cancer in men may include the following:

- Treatment with radiation therapy to your breast/chest.
- Having a disease linked to high levels of estrogen in the body, such as cirrhosis (liver disease) or Klinefelter syndrome (a genetic disorder).
- Having one or more female relatives who have had breast cancer.
- Having mutations (changes) in genes such as *BRCA2*.

Male breast cancer is sometimes caused by inherited gene mutations (changes).

The genes in cells carry the hereditary information that is received from a person's parents. Hereditary breast cancer makes up about 5% to 10% of all breast cancer. Some mutated genes related to breast cancer, such as *BRCA2*, are more common in certain ethnic groups. Men who have a mutated gene related to breast cancer have an increased risk of this disease.

There are tests that can detect (find) mutated genes. These genetic tests are sometimes done for members of families with a high risk of cancer. See the following PDQ summaries for more information:

- [Genetics of Breast and Gynecologic Cancers](#)
- [Breast Cancer Prevention](#)
- [Breast Cancer Screening](#)

Men with breast cancer usually have lumps that can be felt.

Lumps and other signs may be caused by male breast cancer or by other conditions. Check with your doctor if you have any of the following:

- A lump or thickening in or near the breast or in the underarm area.
- A change in the size or shape of the breast.
- A dimple or puckering in the skin of the breast.
- A nipple turned inward into the breast.
- Fluid from the nipple, especially if it's bloody.
- Scaly, red, or swollen skin on the breast, nipple, or areola (the dark area of skin around the nipple).
- Dimples in the breast that look like the skin of an orange, called peau d'orange.

Tests that examine the breasts are used to diagnose breast cancer in men.

The following tests and procedures may be used:

- **Physical exam and health history:** An exam of the body to check general signs of health, including checking for signs of disease, such as lumps or anything else that seems unusual. A history of the patient's health habits and past illnesses and treatments will also be taken.
- **Clinical breast exam (CBE):** An exam of the breast by a doctor or other health professional. The doctor will carefully feel the breasts and under the arms for lumps or anything else that seems unusual.

- **Mammogram:** An x-ray of the breast.
- **Ultrasound exam:** A procedure in which high-energy sound waves (ultrasound) are bounced off internal tissues or organs and make echoes. The echoes form a picture of body tissues called a sonogram. The picture can be printed to be looked at later.
- **MRI (magnetic resonance imaging):** A procedure that uses a magnet, radio waves, and a computer to make a series of detailed pictures of both breasts. This procedure is also called nuclear magnetic resonance imaging (NMRI).
- **Blood chemistry studies:** A procedure in which a blood sample is checked to measure the amounts of certain substances released into the blood by organs and tissues in the body. An unusual (higher or lower than normal) amount of a substance can be a sign of disease.
- **Biopsy:** The removal of cells or tissues so they can be viewed under a microscope by a pathologist to check for signs of cancer. There are four types of biopsies to check for breast cancer:
 - **Excisional biopsy:** The removal of an entire lump of tissue.
 - **Incisional biopsy:** The removal of part of a lump or a sample of tissue.
 - **Core biopsy:** The removal of tissue using a wide needle.
 - **Fine-needle aspiration (FNA) biopsy:** The removal of tissue or fluid using a thin needle.

If cancer is found, tests are done to study the cancer cells.

Decisions about the best treatment are based on the results of these tests. The tests give information about:

- How quickly the cancer may grow.
- How likely it is that the cancer will spread through the body.
- How well certain treatments might work.
- How likely the cancer is to recur (come back).

Tests include the following:

- **Estrogen and progesterone receptor test:** A test to measure the amount of estrogen and progesterone (hormones) receptors in cancer tissue. If there are more estrogen and progesterone receptors than normal, the cancer is called estrogen and/or progesterone receptor positive. This type of breast cancer may grow more quickly. The test results show whether treatment to block estrogen and progesterone may stop the cancer from growing.
- **HER2 test:** A laboratory test to measure how many *HER2/neu* genes there are and how much HER2/neu protein is made in a sample of tissue. If there are more *HER2/neu* genes

or higher levels of HER2/neu protein than normal, the cancer is called HER2/neu positive. This type of breast cancer may grow more quickly and is more likely to spread to other parts of the body. The cancer may be treated with drugs that target the HER2/neu protein, such as trastuzumab and pertuzumab.

Survival for men with breast cancer is similar to survival for women with breast cancer.

Survival for men with breast cancer is similar to that for women with breast cancer when their stage at diagnosis is the same. Breast cancer in men, however, is often diagnosed at a later stage. Cancer found at a later stage may be less likely to be cured.

Certain factors affect prognosis (chance of recovery) and treatment options.

The prognosis and treatment options depend on the following:

- The stage of the cancer (the size of the tumor and whether it is in the breast only or has spread to lymph nodes or other places in the body).
- The type of breast cancer.
- Estrogen-receptor and progesterone-receptor levels in the tumor tissue.
- Whether the cancer is also found in the other breast.
- The man's age and general health.
- Whether the cancer has just been diagnosed or has recurred (come back).

Stages of Male Breast Cancer

KEY POINTS

- After breast cancer has been diagnosed, tests are done to find out if cancer cells have spread within the breast or to other parts of the body.
- There are three ways that cancer spreads in the body.
- Cancer may spread from where it began to other parts of the body.
- In breast cancer, stage is based on the size and location of the primary tumor, the spread of cancer to nearby lymph nodes or other parts of the body, tumor grade, and whether certain biomarkers are present.
- The TNM system is used to describe the size of the primary tumor and the spread of cancer to nearby lymph nodes or other parts of the body.
 - Tumor (T). The size and location of the tumor.

- Lymph Node (N). The size and location of lymph nodes where cancer has spread.
- Metastasis (M). The spread of cancer to other parts of the body.
- The grading system is used to describe how quickly a breast tumor is likely to grow and spread.
- Biomarker testing is used to find out whether breast cancer cells have certain receptors.
- The TNM system, the grading system, and biomarker status are combined to find out the breast cancer stage.
- Talk to your doctor to find out what your breast cancer stage is and how it is used to plan the best treatment for you.
- The treatment of male breast cancer depends partly on the stage of the disease.

After breast cancer has been diagnosed, tests are done to find out if cancer cells have spread within the breast or to other parts of the body.

After breast cancer has been diagnosed, tests are done to find out if cancer cells have spread within the breast or to other parts of the body. This process is called staging. The information gathered from the staging process determines the stage of the disease. It is important to know the stage in order to plan treatment. Breast cancer in men is staged the same as it is in women. The spread of cancer from the breast to lymph nodes and other parts of the body appears to be similar in men and women.

The following tests and procedures may be used in the staging process:

- **Sentinel lymph node biopsy:** The removal of the sentinel lymph node during surgery. The sentinel lymph node is the first lymph node in a group of lymph nodes to receive lymphatic drainage from the primary tumor. It is the first lymph node the cancer is likely to spread to from the primary tumor. A radioactive substance and/or blue dye is injected near the tumor. The substance or dye flows through the lymph ducts to the lymph nodes. The first lymph node to receive the substance or dye is removed. A pathologist views the tissue under a microscope to look for cancer cells. If cancer cells are not found, it may not be necessary to remove more lymph nodes. Sometimes, a sentinel lymph node is found in more than one group of nodes.
- **Chest x-ray:** An x-ray of the organs and bones inside the chest. An x-ray is a type of energy beam that can go through the body and onto film, making a picture of areas inside the body.
- **CT scan (CAT scan):** A procedure that makes a series of detailed pictures of areas inside the body, taken from different angles. The pictures are made by a computer linked to an x-ray machine. A dye may be injected into a vein or swallowed to help the organs or

tissues show up more clearly. This procedure is also called computed tomography, computerized tomography, or computerized axial tomography.

- **Bone scan:** A procedure to check if there are rapidly dividing cells, such as cancer cells, in the bone. A very small amount of radioactive material is injected into a vein and travels through the bloodstream. The radioactive material collects in the bones with cancer and is detected by a scanner.
- **PET scan (positron emission tomography scan):** A procedure to find malignant tumor cells in the body. A small amount of radioactive glucose (sugar) is injected into a vein. The PET scanner rotates around the body and makes a picture of where glucose is being used in the body. Malignant tumor cells show up brighter in the picture because they are more active and take up more glucose than normal cells do.

There are three ways that cancer spreads in the body.

Cancer can spread through tissue, the lymph system, and the blood:

- **Tissue.** The cancer spreads from where it began by growing into nearby areas.
- **Lymph system.** The cancer spreads from where it began by getting into the lymph system. The cancer travels through the lymph vessels to other parts of the body.
- **Blood.** The cancer spreads from where it began by getting into the blood. The cancer travels through the blood vessels to other parts of the body.

Cancer may spread from where it began to other parts of the body.

When cancer spreads to another part of the body, it is called metastasis. Cancer cells break away from where they began (the primary tumor) and travel through the lymph system or blood.

- **Lymph system.** The cancer gets into the lymph system, travels through the lymph vessels, and forms a tumor (metastatic tumor) in another part of the body.
- **Blood.** The cancer gets into the blood, travels through the blood vessels, and forms a tumor (metastatic tumor) in another part of the body.

The metastatic tumor is the same type of cancer as the primary tumor. For example, if breast cancer spreads to the bone, the cancer cells in the bone are actually breast cancer cells. The disease is metastatic breast cancer, not bone cancer.

Metastasis: How Cancer Spreads



Many cancer deaths are caused when cancer moves from the original tumor and spreads to other tissues and organs. This is called metastatic cancer. This animation shows how cancer cells travel from the place in the body where they first formed to other parts of the body.

In breast cancer, stage is based on the size and location of the primary tumor, the spread of cancer to nearby lymph nodes or other parts of the body, tumor grade, and whether certain biomarkers are present.

To plan the best treatment and understand your prognosis, it is important to know the breast cancer stage.

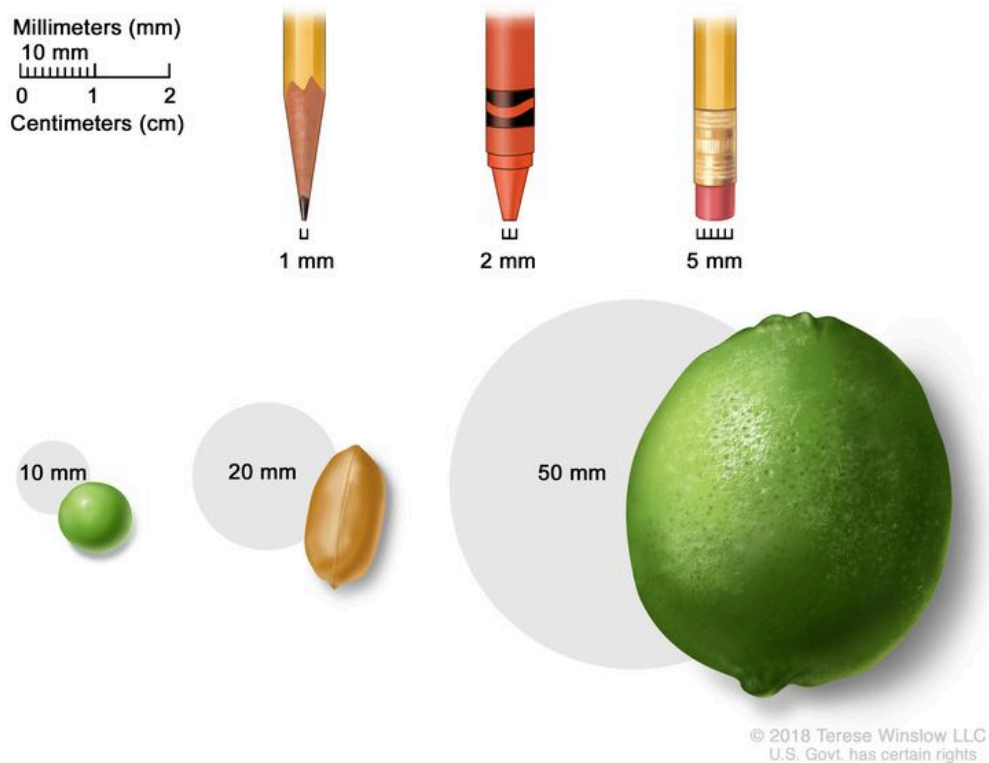
There are 3 types of breast cancer stage groups:

- **Clinical Prognostic Stage** is used first to assign a stage for **all** patients based on health history, physical exam, imaging tests (if done), and biopsies. The Clinical Prognostic Stage is described by the TNM system, tumor grade, and biomarker status (ER, PR, HER2). In clinical staging, mammography or ultrasound is used to check the lymph nodes for signs of cancer.
- **Pathological Prognostic Stage** is then used for patients who have surgery as their first treatment. The Pathological Prognostic Stage is based on all clinical information, biomarker status, and laboratory test results from breast tissue and lymph nodes removed during surgery.
- **Anatomic Stage** is based on the size and the spread of cancer as described by the TNM system. The Anatomic Stage is used in parts of the world where biomarker testing is not available. It is not used in the United States.

The TNM system is used to describe the size of the primary tumor and the spread of cancer to nearby lymph nodes or other parts of the body.

For breast cancer, the TNM system describes the tumor as follows:

Tumor (T). The size and location of the tumor.



Tumor sizes are often measured in millimeters (mm) or centimeters. Common items that can be used to show tumor size in mm include: a sharp pencil point (1 mm), a new crayon point (2 mm), a pencil-top eraser (5 mm), a pea (10 mm), a peanut (20 mm), and a lime (50 mm).

- TX: Primary tumor cannot be assessed.
- T0: No sign of a primary tumor in the breast.
- Tis: Carcinoma in situ. There are 2 types of breast carcinoma in situ:
 - Tis (DCIS): DCIS is a condition in which abnormal cells are found in the lining of a breast duct. The abnormal cells have not spread outside the duct to other tissues in the breast. In some cases, DCIS may become invasive breast cancer that is able to spread to other tissues. At this time, there is no way to know which lesions can become invasive.
 - Tis (Paget disease): Paget disease of the nipple is a condition in which abnormal cells are found in the skin cells of the nipple and may spread to the areola. It is not staged according to the TNM system. If Paget disease AND an invasive breast cancer are present, the TNM system is used to stage the invasive breast cancer.

- T1: The tumor is 20 millimeters or smaller. There are 4 subtypes of a T1 tumor depending on the size of the tumor:
 - T1mi: the tumor is 1 millimeter or smaller.
 - T1a: the tumor is larger than 1 millimeter but not larger than 5 millimeters.
 - T1b: the tumor is larger than 5 millimeters but not larger than 10 millimeters.
 - T1c: the tumor is larger than 10 millimeters but not larger than 20 millimeters.
- T2: The tumor is larger than 20 millimeters but not larger than 50 millimeters.
- T3: The tumor is larger than 50 millimeters.
- T4: The tumor is described as one of the following:
 - T4a: the tumor has grown into the chest wall.
 - T4b: the tumor has grown into the skin—an ulcer has formed on the surface of the skin on the breast, small tumor nodules have formed in the same breast as the primary tumor, and/or there is swelling of the skin on the breast.
 - T4c: the tumor has grown into the chest wall and the skin.
 - T4d: inflammatory breast cancer—one-third or more of the skin on the breast is red and swollen (called peau d'orange).

Lymph Node (N). The size and location of lymph nodes where cancer has spread.

When the lymph nodes are removed by surgery and studied under a microscope by a pathologist, pathologic staging is used to describe the lymph nodes. The pathologic staging of lymph nodes is described below.

- NX: The lymph nodes cannot be assessed.
- N0: No sign of cancer in the lymph nodes, or tiny clusters of cancer cells not larger than 0.2 millimeters in the lymph nodes.
- N1: Cancer is described as one of the following:
 - N1mi: cancer has spread to the axillary (armpit area) lymph nodes and is larger than 0.2 millimeters but not larger than 2 millimeters.
 - N1a: cancer has spread to 1 to 3 axillary lymph nodes and the cancer in at least one of the lymph nodes is larger than 2 millimeters.
 - N1b: cancer has spread to lymph nodes near the breastbone on the same side of the body as the primary tumor, and the cancer is larger than 0.2 millimeters and is found by sentinel lymph node biopsy. Cancer is not found in the axillary lymph nodes.
 - N1c: cancer has spread to 1 to 3 axillary lymph nodes and the cancer in at least one of the lymph nodes is larger than 2 millimeters. Cancer is also found by sentinel

lymph node biopsy in the lymph nodes near the breastbone on the same side of the body as the primary tumor.

- N2: Cancer is described as one of the following:
 - N2a: cancer has spread to 4 to 9 axillary lymph nodes and the cancer in at least one of the lymph nodes is larger than 2 millimeters.
 - N2b: cancer has spread to lymph nodes near the breastbone and the cancer is found by imaging tests. Cancer is not found in the axillary lymph nodes by sentinel lymph node biopsy or lymph node dissection.
- N3: Cancer is described as one of the following:
 - N3a: cancer has spread to 10 or more axillary lymph nodes and the cancer in at least one of the lymph nodes is larger than 2 millimeters, or cancer has spread to lymph nodes below the collarbone.
 - N3b: cancer has spread to 1 to 9 axillary lymph nodes and the cancer in at least one of the lymph nodes is larger than 2 millimeters. Cancer has also spread to lymph nodes near the breastbone and the cancer is found by imaging tests;

or

cancer has spread to 4 to 9 axillary lymph nodes and cancer in at least one of the lymph nodes is larger than 2 millimeters. Cancer has also spread to lymph nodes near the breastbone on the same side of the body as the primary tumor, and the cancer is larger than 0.2 millimeters and is found by sentinel lymph node biopsy.

- N3c: cancer has spread to lymph nodes above the collarbone on the same side of the body as the primary tumor.

When the lymph nodes are checked using mammography or ultrasound, it is called clinical staging. The clinical staging of lymph nodes is not described here.

Metastasis (M). The spread of cancer to other parts of the body.

- M0: There is no sign that cancer has spread to other parts of the body.
- M1: Cancer has spread to other parts of the body, most often the bones, lungs, liver, or brain. If cancer has spread to distant lymph nodes, the cancer in the lymph nodes is larger than 0.2 millimeters. The cancer is called metastatic breast cancer.

The grading system is used to describe how quickly a breast tumor is likely to grow and spread.

The grading system describes a tumor based on how abnormal the cancer cells and tissue look under a microscope and how quickly the cancer cells are likely to grow and spread. Low-grade cancer cells look more like normal cells and tend to grow and spread more

slowly than high-grade cancer cells. To describe how abnormal the cancer cells and tissue are, the pathologist will assess the following three features:

- How much of the tumor tissue has normal breast ducts.
- The size and shape of the nuclei in the tumor cells.
- How many dividing cells are present, which is a measure of how fast the tumor cells are growing and dividing.

For each feature, the pathologist assigns a score of 1 to 3; a score of “1” means the cells and tumor tissue look the most like normal cells and tissue, and a score of “3” means the cells and tissue look the most abnormal. The scores for each feature are added together to get a total score between 3 and 9.

Three grades are possible:

- Total score of 3 to 5: G1 (Low grade or well differentiated).
- Total score of 6 to 7: G2 (Intermediate grade or moderately differentiated).
- Total score of 8 to 9: G3 (High grade or poorly differentiated).

Biomarker testing is used to find out whether breast cancer cells have certain receptors.

Healthy breast cells, and some breast cancer cells, have receptors (biomarkers) that attach to the hormones estrogen and progesterone. These hormones are needed for healthy cells, and some breast cancer cells, to grow and divide. To check for these biomarkers, samples of tissue containing breast cancer cells are removed during a biopsy or surgery. The samples are tested in a laboratory to see whether the breast cancer cells have estrogen or progesterone receptors.

Another type of receptor (biomarker) that is found on the surface of all breast cancer cells is called HER2. HER2 receptors are needed for the breast cancer cells to grow and divide.

For breast cancer, biomarker testing includes the following:

- **Estrogen receptor (ER).** If the breast cancer cells have estrogen receptors, the cancer cells are called ER positive (ER+). If the breast cancer cells do not have estrogen receptors, the cancer cells are called ER negative (ER-).
- **Progesterone receptor (PR).** If the breast cancer cells have progesterone receptors, the cancer cells are called PR positive (PR+). If the breast cancer cells do not have progesterone receptors, the cancer cells are called PR negative (PR-).
- **Human epidermal growth factor type 2 receptor (HER2/neu or HER2).** If the breast cancer cells have larger than normal amounts of HER2 receptors on their surface, the cancer cells are called HER2 positive (HER2+). If the breast cancer cells have a normal

amount of HER2 on their surface, the cancer cells are called HER2 negative (HER2-).
HER2+ breast cancer is more likely to grow and divide faster than HER2- breast cancer.

Sometimes the breast cancer cells will be described as triple negative or triple positive.

- **Triple negative.** If the breast cancer cells do not have estrogen receptors, progesterone receptors, or a larger than normal amount of HER2 receptors, the cancer cells are called triple negative.
- **Triple positive.** If the breast cancer cells do have estrogen receptors, progesterone receptors, and a larger than normal amount of HER2 receptors, the cancer cells are called triple positive.

It is important to know the estrogen receptor, progesterone receptor, and HER2 receptor status to choose the best treatment. There are drugs that can stop the receptors from attaching to the hormones estrogen and progesterone and stop the cancer from growing. Other drugs may be used to block the HER2 receptors on the surface of the breast cancer cells and stop the cancer from growing.

The TNM system, the grading system, and biomarker status are combined to find out the breast cancer stage.

Here are 3 examples that combine the TNM system, the grading system, and the biomarker status to find out the Pathological Prognostic breast cancer stage for a woman whose first treatment was surgery:

If the tumor size is 30 millimeters (T2), has not spread to nearby lymph nodes (N0), has not spread to distant parts of the body (M0), and is:

- Grade 1
- HER2+
- ER-
- PR-

The cancer is stage IIA.

If the tumor size is 53 millimeters (T3), has spread to 4 to 9 axillary lymph nodes (N2), has not spread to other parts of the body (M0), and is:

- Grade 2
- HER2+
- ER+
- PR-

The tumor is stage IIIA.

If the tumor size is 65 millimeters (T3), has spread to 3 axillary lymph nodes (N1a), has spread to the lungs (M1), and is:

- Grade 1
- HER2+
- ER-
- PR-

The cancer is stage IV (metastatic breast cancer).

Talk to your doctor to find out what your breast cancer stage is and how it is used to plan the best treatment for you.

After surgery, your doctor will receive a pathology report that describes the size and location of the primary tumor, the spread of cancer to nearby lymph nodes, tumor grade, and whether certain biomarkers are present. The pathology report and other test results are used to determine your breast cancer stage.

You are likely to have many questions. Ask your doctor to explain how staging is used to decide the best options to treat your cancer and whether there are clinical trials that might be right for you.

The treatment of male breast cancer depends partly on the stage of the disease.

For treatment options for stage I, stage II, stage IIIA, and operable stage IIIC breast cancer, see [Treatment of Early/Localized/Operable Male Breast Cancer](#).

For treatment options for cancer that has recurred (come back) near the area where it first formed, see [Treatment of Locoregional Recurrent Male Breast Cancer](#).

For treatment options for stage IV (metastatic) breast cancer or breast cancer that has recurred in other parts of the body, see [Treatment of Metastatic Male Breast Cancer](#).

Inflammatory Male Breast Cancer

In inflammatory breast cancer, cancer has spread to the skin of the breast and the breast looks red and swollen and feels warm. The redness and warmth occur because the cancer cells block the lymph vessels in the skin. The skin of the breast may also show the dimpled appearance called peau d'orange (like the skin of an orange). There may not be any lumps in

the breast that can be felt. Inflammatory breast cancer may be stage IIIB, stage IIIC, or stage IV.

Treatment Option Overview

KEY POINTS

- There are different types of treatment for men with breast cancer.
- Five types of standard treatment are used to treat men with breast cancer:
 - Surgery
 - Chemotherapy
 - Hormone therapy
 - Radiation therapy
 - Targeted therapy
- Treatment for male breast cancer may cause side effects.

There are different types of treatment for men with breast cancer.

Different types of treatment are available for men with breast cancer. Some treatments are standard (the currently used treatment), and some are being tested in clinical trials. A treatment clinical trial is a research study meant to help improve current treatments or obtain information on new treatments for patients with cancer. When clinical trials show that a new treatment is better than the standard treatment, the new treatment may become the standard treatment.

For some patients, taking part in a clinical trial may be the best treatment choice. Many of today's standard treatments for cancer are based on earlier clinical trials. Patients who take part in a clinical trial may receive the standard treatment or be among the first to receive a new treatment.

Patients who take part in clinical trials also help improve the way cancer will be treated in the future. Even when clinical trials do not lead to effective new treatments, they often answer important questions and help move research forward.

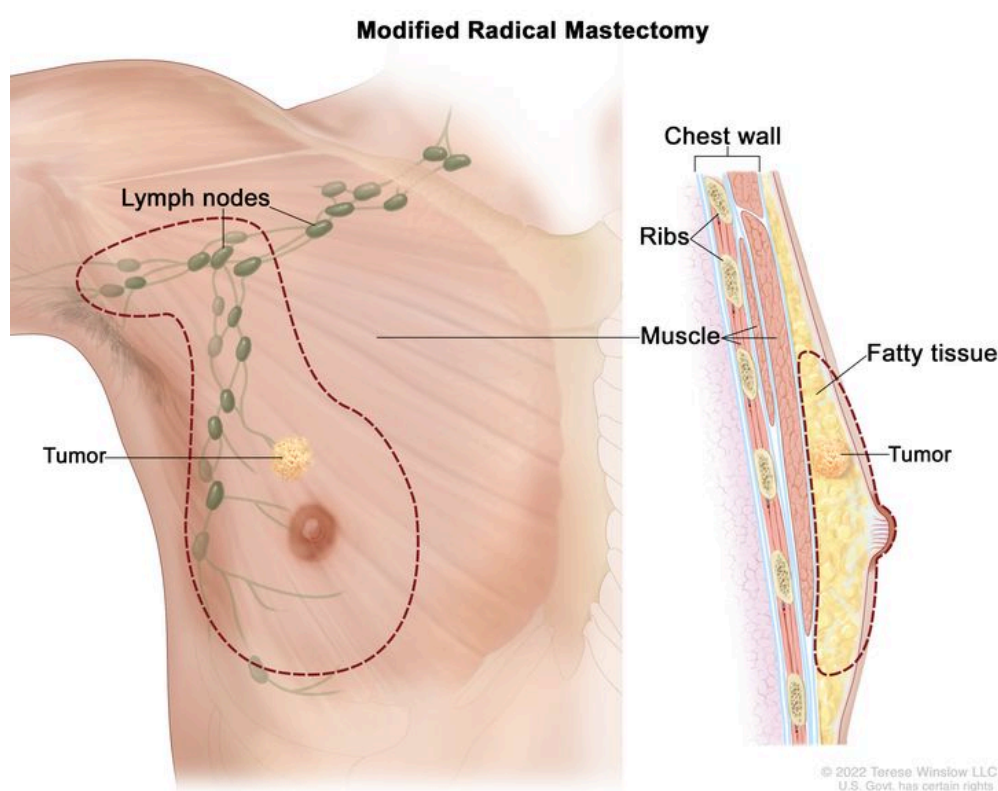
Some clinical trials only include patients who have not yet received treatment. Other trials test treatments for patients whose cancer has not gotten better. There are also clinical trials that test new ways to stop cancer from recurring (coming back) or reduce the side effects of cancer treatment.

Clinical trials are taking place in many parts of the country. Information about clinical trials is available from the [NCI website](#). Choosing the most appropriate cancer treatment is a decision that ideally involves the patient, family, and health care team.

Five types of standard treatment are used to treat men with breast cancer:

Surgery

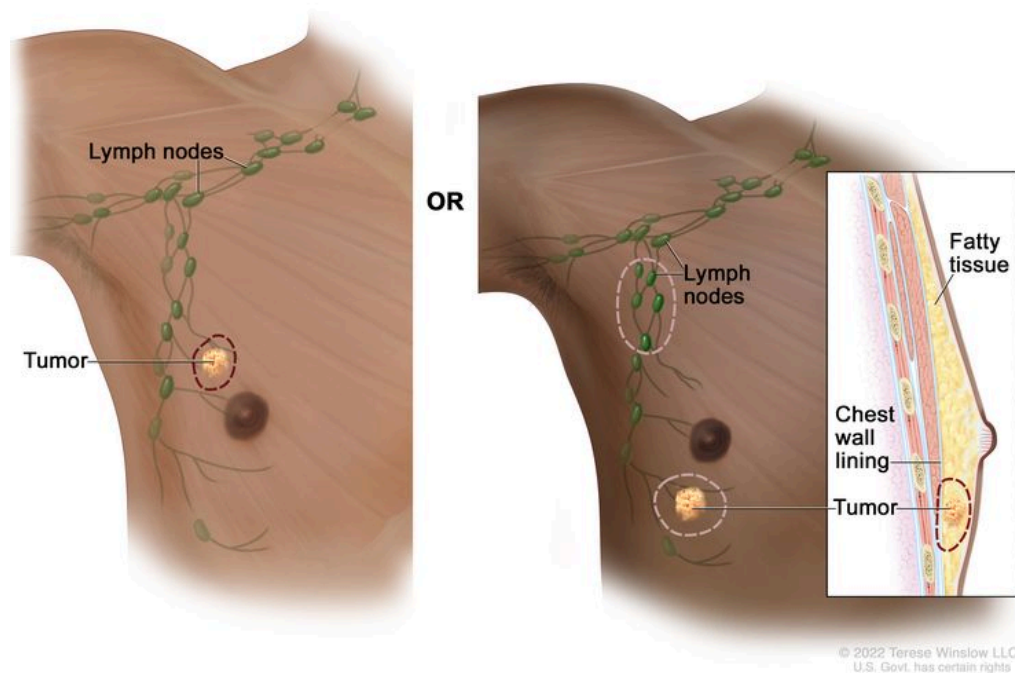
Surgery for men with breast cancer is usually a modified radical mastectomy, surgery to remove the whole breast that has cancer. This may include removal of the nipple, areola (the dark-colored skin around the nipple), and skin over the breast. Most of the lymph nodes under the arm are also removed.



Modified radical mastectomy. The whole breast and most of the lymph nodes under the arm are removed.

Breast-conserving surgery, an operation to remove the cancer but not the breast itself, is also used for some men with breast cancer. A lumpectomy is done to remove the tumor (lump) and a small amount of normal tissue around it. Radiation therapy is given after surgery to kill any cancer cells that are left.

Lumpectomy



Lumpectomy. The tumor and some normal tissue around it are removed, but not the breast itself. Some lymph nodes under the arm may also be removed. If the cancer is near the chest wall, part of the chest wall lining may be removed as well.

Chemotherapy

Chemotherapy is a cancer treatment that uses drugs to stop the growth of cancer cells, either by killing the cells or by stopping them from dividing. When chemotherapy is taken by mouth or injected into a vein or muscle, the drugs enter the bloodstream and can reach cancer cells throughout the body (systemic chemotherapy).

See [Drugs Approved for Breast Cancer](#) for more information.

Hormone therapy

Hormone therapy is a cancer treatment that removes hormones or blocks their action and stops cancer cells from growing. Hormones are substances made by glands in the body and circulated in the bloodstream. Some hormones can cause certain cancers to grow. If tests show that the cancer cells have places where hormones can attach (receptors), drugs, surgery, or radiation therapy is used to reduce the production of hormones or block them from working.

Hormone therapy with tamoxifen is often given to patients with estrogen-receptor and progesterone-receptor positive breast cancer and to patients with metastatic breast cancer (cancer that has spread to other parts of the body).

Hormone therapy with an aromatase inhibitor is given to some men who have metastatic breast cancer. Aromatase inhibitors decrease the body's estrogen by blocking an enzyme called aromatase from turning androgen into estrogen. Anastrozole, letrozole, and exemestane are types of aromatase inhibitors.

Hormone therapy with a luteinizing hormone-releasing hormone (LHRH) agonist is given to some men who have metastatic breast cancer. LHRH agonists affect the pituitary gland, which controls how much testosterone is made by the testicles. In men who are taking LHRH agonists, the pituitary gland tells the testicles to make less testosterone. Leuprolide and goserelin are types of LHRH agonists.

Other types of hormone therapy include megestrol acetate or anti-estrogen therapy, such as fulvestrant.

See [Drugs Approved for Breast Cancer](#) for more information.

Radiation therapy

Radiation therapy is a cancer treatment that uses high-energy x-rays or other types of radiation to kill cancer cells or keep them from growing. External radiation therapy uses a machine outside the body to send radiation toward the area of the body with cancer.

Targeted therapy

Targeted therapy is a type of treatment that uses drugs or other substances to identify and attack specific cancer cells. Targeted therapies usually cause less harm to normal cells than chemotherapy or radiation therapy do. Monoclonal antibody therapy, tyrosine kinase inhibitors, cyclin-dependent kinase inhibitors, and mammalian target of rapamycin (mTOR) inhibitors are types of targeted therapies used to treat men with breast cancer.

Monoclonal antibodies are immune system proteins made in the laboratory to treat many diseases, including cancer. As a cancer treatment, these antibodies can attach to a specific target on cancer cells or other cells that may help cancer cells grow. The antibodies are able to then kill the cancer cells, block their growth, or keep them from spreading. Monoclonal antibodies are given by infusion. They may be used alone or to carry drugs, toxins, or radioactive material directly to cancer cells.

Types of monoclonal antibody therapy include the following:

- Trastuzumab is a monoclonal antibody that blocks the effects of the growth factor protein HER2.
- Pertuzumab is a monoclonal antibody that may be combined with trastuzumab and chemotherapy to treat breast cancer.
- Ado-trastuzumab emtansine is a monoclonal antibody linked to an anticancer drug. This is called an antibody-drug conjugate. It may be used to treat men with hormone

receptor positive breast cancer that has spread to other parts of the body.



How do monoclonal antibodies work to treat cancer? This video shows how monoclonal antibodies, such as trastuzumab, pembrolizumab, and rituximab, block molecules cancer cells need to grow, flag cancer cells for destruction by the body's immune system, or deliver harmful substances to cancer cells.

Tyrosine kinase inhibitors are targeted therapy drugs that block signals needed for tumors to grow. Lapatinib is a tyrosine kinase inhibitor that may be used to treat men with metastatic breast cancer.

Cyclin-dependent kinase inhibitors are targeted therapy drugs that block proteins called cyclin-dependent kinases, which cause the growth of cancer cells. Palbociclib is a cyclin-dependent kinase inhibitor used to treat men with metastatic breast cancer.

Mammalian target of rapamycin (mTOR) inhibitors block a protein called mTOR, which may keep cancer cells from growing and prevent the growth of new blood vessels that tumors need to grow.

See [Drugs Approved for Breast Cancer](#) for more information.

Treatment for male breast cancer may cause side effects.

For information about side effects caused by treatment for cancer, visit our [Side Effects](#) page.

Treatment of Early/Localized/Operable Male Breast Cancer

For information about the treatments listed below, see the [Treatment Option Overview](#) section.

Treatment of early, localized, or operable breast cancer may include the following:

- [Initial surgery](#).
- [Adjuvant therapy](#).

Initial Surgery

Treatment for men diagnosed with breast cancer is usually modified radical mastectomy.

Breast-conserving surgery with lumpectomy followed by radiation therapy may be used for some men.

Adjuvant Therapy

Therapy given after an operation when cancer cells can no longer be seen is called adjuvant therapy. Even if the doctor removes all the cancer that can be seen at the time of the operation, the patient may be given radiation therapy, chemotherapy, hormone therapy, and/or targeted therapy after surgery, to try to kill any cancer cells that may be left.

- **Node-negative:** For men whose cancer is node-negative (cancer has not spread to the lymph nodes), adjuvant therapy should be considered on the same basis as for a woman with breast cancer because there is no evidence that response to therapy is different for men and women.
- **Node-positive:** For men whose cancer is node-positive (cancer has spread to the lymph nodes), adjuvant therapy may include the following:
 - Chemotherapy.
 - Hormone therapy with tamoxifen (to block the effect of estrogen) or less often, aromatase inhibitors (to reduce the amount of estrogen in the body).
 - Targeted therapy with a monoclonal antibody (trastuzumab or pertuzumab).

These treatments appear to increase survival in men as they do in women. The patient's response to hormone therapy depends on whether there are hormone receptors (proteins) in the tumor. Most breast cancers in men have these receptors. Hormone therapy is usually recommended for male breast cancer patients, but it can have many side effects, including hot flashes and impotence (the inability to have an erection adequate for sexual intercourse).

Treatment of Locoregional Recurrent Male Breast Cancer

For information about the treatments listed below, see the [Treatment Option Overview](#) section.

For men with locally recurrent disease (cancer that has come back in a limited area after treatment), treatment options include:

- Surgery.
- Radiation therapy combined with chemotherapy.

Treatment of Metastatic Male Breast Cancer

For information about the treatments listed below, see the [Treatment Option Overview](#) section.

Treatment options for metastatic breast cancer (cancer that has spread to distant parts of the body) may include the following:

Hormone therapy

In men who have just been diagnosed with metastatic breast cancer that is hormone receptor positive or if the hormone receptor status is not known, treatment may include:

- Tamoxifen therapy.
- Aromatase inhibitor therapy (anastrozole, letrozole, or exemestane) with or without an LHRH agonist. Sometimes cyclin-dependent kinase inhibitor therapy (palbociclib) is also given.

In men whose tumors are hormone receptor positive or hormone receptor unknown, with spread to the bone or soft tissue only, and who have been treated with tamoxifen, treatment may include:

- Aromatase inhibitor therapy with or without LHRH agonist.
- Other hormone therapy such as megestrol acetate, estrogen or androgen therapy, or anti-estrogen therapy such as fulvestrant.

Targeted therapy

In men with metastatic breast cancer that is hormone receptor positive and has not responded to other treatments, options may include targeted therapy such as:

- Trastuzumab, lapatinib, pertuzumab, or mTOR inhibitors.
- Antibody-drug conjugate therapy with ado-trastuzumab emtansine.

- Cyclin-dependent kinase inhibitor therapy (palbociclib) combined with letrozole.

In men with metastatic breast cancer that is HER2/neu positive, treatment may include:

- Targeted therapy such as trastuzumab, pertuzumab, ado-trastuzumab emtansine, or lapatinib.

Chemotherapy

In men with metastatic breast cancer that is hormone receptor negative, has not responded to hormone therapy, has spread to other organs or has caused symptoms, treatment may include:

- Chemotherapy with one or more drugs.

Surgery

- Total mastectomy for men with open or painful breast lesions. Radiation therapy may be given after surgery.
- Surgery to remove cancer that has spread to the brain or spine. Radiation therapy may be given after surgery.
- Surgery to remove cancer that has spread to the lung.
- Surgery to repair or help support weak or broken bones. Radiation therapy may be given after surgery.
- Surgery to remove fluid that has collected around the lungs or heart.

Radiation therapy

- Radiation therapy to the bones, brain, spinal cord, breast, or chest wall to relieve symptoms and improve quality of life.
- Strontium-89 (a radionuclide) to relieve pain from cancer that has spread to bones throughout the body.

Other treatment options

Other treatment options for metastatic breast cancer include:

- Drug therapy with bisphosphonates or denosumab to reduce bone disease and pain when cancer has spread to the bone. (See the PDQ summary on [Cancer Pain](#) for more information about bisphosphonates.)
- Clinical trials testing new anticancer drugs, new drug combinations, and new ways of giving treatment.

Childhood Breast Cancer Treatment (PDQ®)– Patient Version

[Go to Health Professional Version](#)

General Information About Childhood Breast Cancer

KEY POINTS

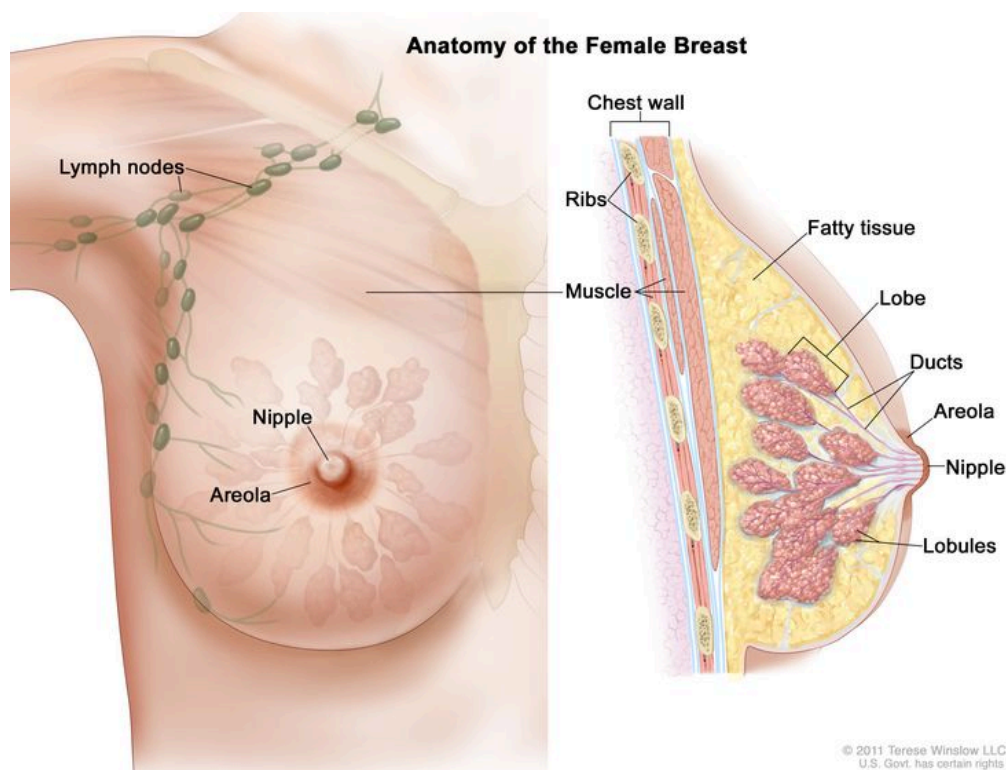
- Breast cancer is a disease in which malignant (cancer) cells form in the tissues of the breast.
- Most breast tumors in children are fibroadenomas (not cancer).
- Radiation therapy to the breast or chest to treat a previous cancer increases the risk of breast cancer.
- Genetic counseling may be done for patients with breast cancer and a family history of breast cancer.
- Signs of breast cancer include a lump or thickening in or near the breast.
- Tests that examine the breast are used to diagnose breast cancer.

Breast cancer is a disease in which malignant (cancer) cells form in the tissues of the breast.

The breast is made up of lobes and ducts. Each breast has 15 to 20 sections called lobes. Each lobe has many smaller sections called lobules. Lobules end in dozens of tiny bulbs that can make milk. The lobes, lobules, and bulbs are linked by thin tubes called ducts.

Each breast also has blood vessels and lymph vessels. The lymph vessels carry an almost colorless, watery fluid called lymph. Lymph vessels carry lymph between lymph nodes. Lymph nodes are small, bean-shaped structures found throughout the body. They filter lymph and store white blood cells that help fight infection and disease. Groups of lymph nodes are found near the breast in the axilla (under the arm), above the collarbone, and in the chest.

Breast cancer can occur in the breast tissue of both males and females.



Anatomy of the female breast. The nipple and areola are shown on the outside of the breast. The lymph nodes, lobes, lobules, ducts, and other parts of the inside of the breast are also shown.

Breast cancer is the most common cancer among female adolescents and young adults (age 15 to 39 years), but less than 5% of all breast cancers occur in this age group. Breast cancer in adolescents and young adults is often more aggressive and more difficult to treat than in older women, but treatment options are similar.

Most breast tumors in children are fibroadenomas (not cancer).

Fibroadenomas are benign tumors. Other benign breast tumors may include tubular adenomas, phyllodes tumors, and fibroepithelial neoplasms. While most phyllodes tumors are benign, some can be cancer. If a breast tumor grows quickly, is large in size, or there is more than one tumor, a core-needle biopsy or an excisional biopsy will be done. The tissues removed during the biopsy will be viewed under a microscope by a pathologist to check for signs of cancer.

Radiation therapy to the breast or chest to treat a previous cancer increases the risk of breast cancer.

Anything that increases a person's chance of getting a disease is called a risk factor. Not every child with one or more risk factors will develop childhood breast cancer, and it will develop in some children who don't have any known risk factors. Talk with your child's doctor if you think your child may be at risk for breast cancer.

Risk factors for breast cancer in children, adolescents, and young adults include the following:

- Past treatment with radiation therapy to the breast or chest for another cancer, such as Hodgkin lymphoma.
- Having a personal history of a type of cancer that may spread to the breast, such as leukemia, rhabdomyosarcoma, soft tissue sarcoma, or lymphoma.
- A family history of breast cancer in a mother, father, sister, or brother.
- Inherited changes in the *BRCA1* or *BRCA2* gene or in other genes that increase the risk of breast cancer.

Genetic counseling may be done for patients with breast cancer and a family history of breast cancer.

It is not always clear from the family medical history whether a condition is inherited. Certain families may benefit from genetic counseling and genetic testing. Genetic counselors and other specially trained health professionals can help parents understand the following:

- Their family medical history.
- Their options for genetic testing for the *BRCA1*, *BRCA2*, or other genes that increase the risk for breast cancer.
- The risk of cancer for the child and the child's siblings.
- The risks and benefits of learning genetic information.

Genetic counselors can also help parents cope with their child's genetic testing results, including how to discuss the results with family members.

Signs of breast cancer include a lump or thickening in or near the breast.

These and other signs and symptoms may be caused by breast cancer or by other conditions.

Check with your child's doctor if your child has any of the following:

- A lump or thickening in or near the breast or in the underarm area.
- A change in the size or shape of the breast.
- A dimple or puckering in the skin of the breast.
- A nipple turned inward into the breast.
- Fluid, other than breast milk, from the nipples, including blood.

- Scaly, red, or swollen skin on the breast, nipple, or areola (the dark area of skin that is around the nipple).
- Dimples in the breast that look like the skin of an orange, called peau d'orange.

Tests that examine the breast are used to diagnose breast cancer.

In addition to asking about your child's personal and family health history and doing a physical exam, your child's doctor may perform the following tests and procedures.

- **Clinical breast exam (CBE):** An exam of the breast by a doctor or other health professional. The doctor will carefully feel the breast and under the arm for lumps or anything else that seems unusual.
- **Mammogram:** An x-ray of the breast. When treatment for another cancer included radiation therapy to the breast or chest, it is important to have a mammogram and MRI of the breast to check for breast cancer. These should be done beginning at age 25, or 8 years after finishing radiation therapy, whichever is later.
- **Breast MRI (magnetic resonance imaging):** A procedure that uses a magnet, radio waves, and a computer to make a series of detailed pictures of both breasts. This procedure is also called nuclear magnetic resonance imaging (NMRI).
- **Ultrasound exam:** A procedure in which high-energy sound waves (ultrasound) are bounced off internal tissues or organs and make echoes. The echoes form a picture of body tissues called a sonogram. The picture can be printed to be looked at later.
- **Chest x-ray:** An x-ray of the organs and bones inside the chest. An x-ray is a type of energy beam that can go through the body and onto film, making a picture of areas inside the body.
- **Biopsy:** The removal of cells or tissues so they can be viewed under a microscope by a pathologist to check for signs of cancer.

Stages of Childhood Breast Cancer

KEY POINTS

- There is no standard staging system for childhood breast cancer.
- There are three ways cancer spreads in the body.
- Cancer may spread from where it began to other parts of the body.

There is no standard staging system for childhood breast cancer.

The process used to find out if cancer has spread from the breast to nearby areas or to other parts of the body is called staging. There is no standard staging system for childhood

breast cancer. The results of [tests and procedures](#) done to diagnose breast cancer are used to help make decisions about treatment.

Sometimes childhood breast cancer recurs (comes back) in the breast or other parts of the body after treatment.

There are three ways cancer spreads in the body.

Cancer can spread through tissue, the lymph system, and the blood:

- Tissue. The cancer spreads from where it began by growing into nearby areas.
- Lymph system. The cancer spreads from where it began by getting into the lymph system. The cancer travels through the lymph vessels to other parts of the body.
- Blood. The cancer spreads from where it began by getting into the blood. The cancer travels through the blood vessels to other parts of the body.

Cancer may spread from where it began to other parts of the body.

When cancer spreads to another part of the body, it is called metastasis. Cancer cells break away from where they began (the primary tumor) and travel through the lymph system or blood.

- Lymph system. The cancer gets into the lymph system, travels through the lymph vessels, and forms a tumor (metastatic tumor) in another part of the body.
- Blood. The cancer gets into the blood, travels through the blood vessels, and forms a tumor (metastatic tumor) in another part of the body.

The metastatic tumor is the same type of cancer as the primary tumor. For example, if breast cancer spreads to the bone, the cancer cells in the bone are actually breast cancer cells. The disease is metastatic breast cancer, not bone cancer.

Metastasis: How Cancer Spreads



Many cancer deaths are caused when cancer moves from the original tumor and spreads to other tissues and organs. This is called metastatic cancer. This animation shows how cancer cells travel from the place in the body where they first formed to other parts of the body.

Treatment Option Overview

KEY POINTS

- There are different types of treatment for children and adolescents with breast tumors or cancer.
- Children and adolescents with breast cancer should have their treatment planned by a team of doctors who are experts in treating childhood cancer.
- Two types of standard treatment are used for benign breast tumors:
 - Watchful waiting
 - Surgery
- Three types of standard treatment are used for breast cancer:
 - Surgery
 - Radiation therapy
 - Chemotherapy
- New types of treatment are being tested in clinical trials.
- Treatment for childhood breast cancer may cause side effects.
- Patients may want to think about taking part in a clinical trial.
- Patients can enter clinical trials before, during, or after starting their cancer treatment.
- Follow-up tests may be needed.

There are different types of treatment for children and adolescents with breast tumors or cancer.

Some treatments are standard (the currently used treatment), and some are being tested in clinical trials. A treatment clinical trial is a research study meant to help improve current treatments or obtain information on new treatments for patients with cancer. When clinical trials show that a new treatment is better than the standard treatment, the new treatment may become the standard treatment.

Because cancer in children is rare, taking part in a clinical trial should be considered. Some clinical trials are open only to patients who have not started treatment.

Children and adolescents with breast cancer should have their treatment planned by a team of doctors who are experts in treating childhood cancer.

Treatment will be overseen by a pediatric oncologist, a doctor who specializes in treating children with cancer. The pediatric oncologist works with other pediatric health professionals who are experts in treating children with cancer and who specialize in certain areas of medicine. This may include the following specialists and others:

- Pediatrician.
- Pediatric surgeon.
- Radiation oncologist.
- Pathologist.
- Pediatric nurse specialist.
- Social worker.
- Rehabilitation specialist.
- Psychologist.
- Child-life specialist.
- Fertility specialist.

Two types of standard treatment are used for benign breast tumors:

Watchful waiting

Watchful waiting is closely monitoring a patient's condition without giving any treatment until signs or symptoms appear or change. Benign breast tumors may disappear without treatment.

Surgery

Surgery is done to remove the tumor, but not the whole breast.

Three types of standard treatment are used for breast cancer:

Surgery

Surgery is done to remove the cancer, but not the whole breast.

Radiation therapy

Radiation therapy is a cancer treatment that uses high-energy x-rays or other types of radiation to kill cancer cells or keep them from growing. External radiation therapy uses a machine outside the body to send radiation toward the area of the body with cancer.

Chemotherapy

Chemotherapy is a cancer treatment that uses drugs to stop the growth of cancer cells, either by killing the cells or by stopping them from dividing. When chemotherapy is taken by mouth or injected into a vein or muscle, the drug enters the bloodstream and can reach cancer cells throughout the body (systemic chemotherapy).

New types of treatment are being tested in clinical trials.

Information about clinical trials is available from the [NCI website](#).

Treatment for childhood breast cancer may cause side effects.

To learn more about side effects that begin during treatment for cancer, visit [Side Effects](#).

Side effects from cancer treatment that begin after treatment and continue for months or years are called late effects. Late effects of cancer treatment may include:

- Physical problems, including fertility problems.
- Changes in mood, feelings, thinking, learning, or memory.
- Second cancers (new types of cancer) or other conditions.

Some late effects may be treated or controlled. It is important to talk with your child's doctors about the possible late effects caused by some treatments. For more information, see [Late Effects of Treatment for Childhood Cancer](#).

Patients may want to think about taking part in a clinical trial.

For some patients, taking part in a clinical trial may be the best treatment choice. Clinical trials are part of the cancer research process. Clinical trials are done to find out if new cancer treatments are safe and effective or better than the standard treatment.

Many of today's standard treatments for cancer are based on earlier clinical trials. Patients who take part in a clinical trial may receive the standard treatment or be among the first to receive a new treatment.

Patients who take part in clinical trials also help improve the way cancer will be treated in the future. Even when clinical trials do not lead to effective new treatments, they often answer important questions and help move research forward.

Patients can enter clinical trials before, during, or after starting their cancer treatment.

Some clinical trials only include patients who have not yet received treatment. Other trials test treatments for patients whose cancer has not gotten better. There are also clinical trials that test new ways to stop cancer from recurring (coming back) or reduce the side effects of cancer treatment.

Clinical trials are taking place in many parts of the country. Information about clinical trials supported by NCI can be found on NCI's [clinical trials search](#) webpage. Clinical trials supported by other organizations can be found on the [ClinicalTrials.gov](#) website.

Follow-up tests may be needed.

As your child goes through treatment, they will have follow-up tests or check-ups. Some of the tests that were done to diagnose the cancer may be repeated to see how well the treatment is working. Decisions about whether to continue, change, or stop treatment may be based on the results of these tests.

Some of the tests will continue to be done from time to time after treatment has ended. The results of these tests can show if your child's condition has changed or if the cancer has recurred (come back).

Treatment of Benign Childhood Breast Tumors

For more information about the treatments listed below, see the [Treatment Option Overview](#) section.

Treatment of newly diagnosed benign breast tumors in children may include the following:

- Watchful waiting. These tumors may disappear without treatment.
- Surgery to remove the tumor. Surgery may also be used for tumors that recur (come back).

Treatment of Childhood Breast Cancer

For more information about the treatments listed below, see the [Treatment Option Overview](#) section.

Treatment of newly diagnosed breast cancer in children may include the following:

- Surgery to remove the cancer, but not the whole breast. Radiation therapy or chemotherapy may also be given.

Sometimes childhood breast cancer may come back after treatment. If your child is diagnosed with recurrent breast cancer, your child's doctor will work with you to plan treatment.

For more information on the treatment of adolescents and young adults with breast cancer, see [Breast Cancer Treatment \(Adult\)](#).

Use our [clinical trial search](#) to find NCI-supported cancer clinical trials that are accepting patients. You can search for trials based on the type of cancer, the age of the patient, and where the trials are being done. [General information](#) about clinical trials is also available.

To Learn More About Childhood Breast Cancer

For more information from the National Cancer Institute about breast cancer, see the following:

- [Breast Cancer Home Page](#)
- [BRCA Gene Changes: Cancer Risk and Genetic Testing](#)
- [Genetic Testing for Inherited Cancer Susceptibility Syndromes](#)

For more childhood cancer information and other general cancer resources, visit:

- [About Cancer](#)
- [Childhood Cancers](#)
- [CureSearch for Children's Cancer](#)
- [Late Effects of Treatment for Childhood Cancer](#)
- [Adolescents and Young Adults with Cancer](#)
- [Children with Cancer: A Guide for Parents](#)
- [Cancer in Children and Adolescents](#)
- [Cancer Staging](#)
- [Coping with Cancer](#)
- [Questions to Ask Your Doctor about Cancer](#)
- [For Survivors, Caregivers, and Advocates](#)

About This PDQ Summary

Breast Cancer Treatment During Pregnancy (PDQ®)–Patient Version

[Go to Health Professional Version](#)

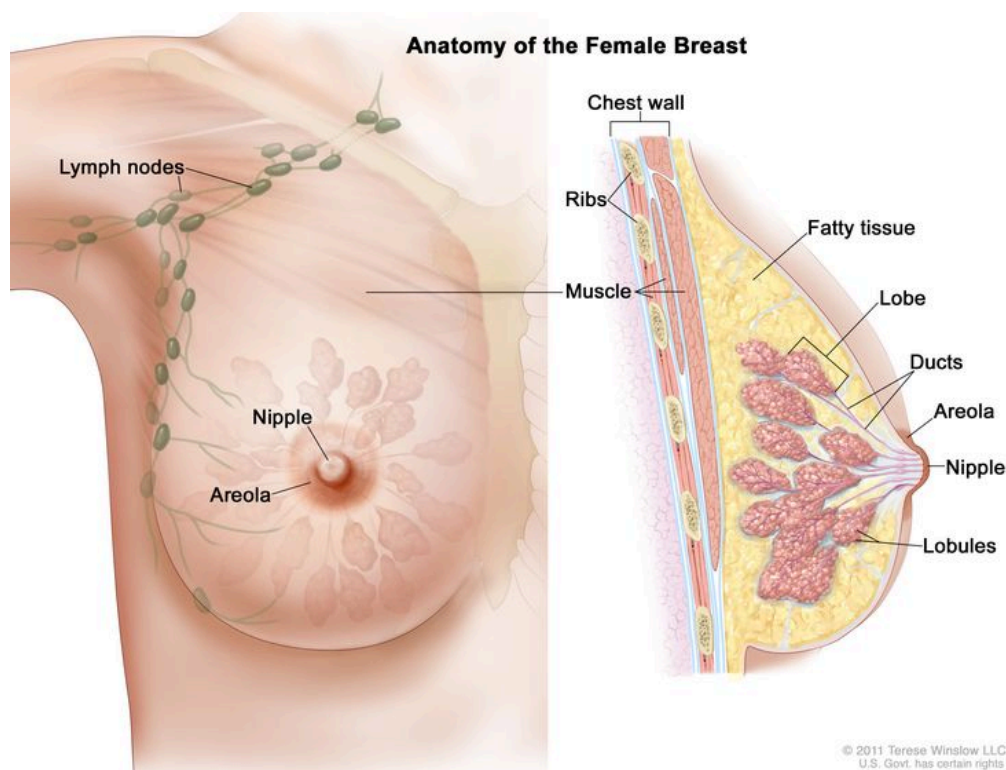
General Information About Breast Cancer Treatment During Pregnancy

KEY POINTS

- Breast cancer is a disease in which malignant (cancer) cells form in the tissues of the breast.
- Sometimes breast cancer occurs in women who are pregnant or have just given birth.
- Signs of breast cancer include a lump or change in the breast.
- It may be difficult to detect (find) breast cancer early in pregnant or nursing women.
- Breast exams should be part of prenatal and postnatal care.
- Tests that examine the breasts are used to diagnose breast cancer.
- If cancer is found, tests are done to study the cancer cells.
- Certain factors affect prognosis (chance of recovery) and treatment options.

Breast cancer is a disease in which malignant (cancer) cells form in the tissues of the breast.

The breast is made up of lobes and ducts. Each breast has 15 to 20 sections called lobes. Each lobe has many smaller sections called lobules. Lobules end in dozens of tiny bulbs that can make milk. The lobes, lobules, and bulbs are linked by thin tubes called ducts.



Anatomy of the female breast. The nipple and areola are shown on the outside of the breast. The lymph nodes, lobes, lobules, ducts, and other parts of the inside of the breast are also shown.

Each breast also has blood vessels and lymph vessels. The lymph vessels carry an almost colorless, watery fluid called lymph. Lymph vessels carry lymph between lymph nodes. Lymph nodes are small, bean-shaped structures found throughout the body. They filter lymph and store white blood cells that help fight infection and disease. Groups of lymph nodes are found near the breast in the axilla (under the arm), above the collarbone, and in the chest.

Sometimes breast cancer occurs in women who are pregnant or have just given birth.

Breast cancer occurs about once in every 3,000 pregnancies. It occurs most often in women aged 32 to 38 years. Because many women are choosing to delay having children, it is likely that the number of new cases of breast cancer during pregnancy will increase.

Signs of breast cancer include a lump or change in the breast.

These and other signs may be caused by breast cancer or by other conditions. Check with your doctor if you have any of the following:

- A lump or thickening in or near the breast or in the underarm area.
- A change in the size or shape of the breast.
- A dimple or puckering in the skin of the breast.

- A nipple turned inward into the breast.
- Fluid, other than breast milk, from the nipple, especially if it's bloody.
- Scaly, red, or swollen skin on the breast, nipple, or areola (the dark area of skin around the nipple).
- Dimples in the breast that look like the skin of an orange, called peau d'orange.

It may be difficult to detect (find) breast cancer early in pregnant or nursing women.

The breasts usually get larger, tender, or lumpy in women who are pregnant, nursing, or have just given birth. This occurs because of normal hormone changes that take place during pregnancy. These changes can make small lumps difficult to detect. The breasts may also become denser. It is more difficult to detect breast cancer in women with dense breasts using mammography. Because these breast changes can delay diagnosis, breast cancer is often found at a later stage in these women.

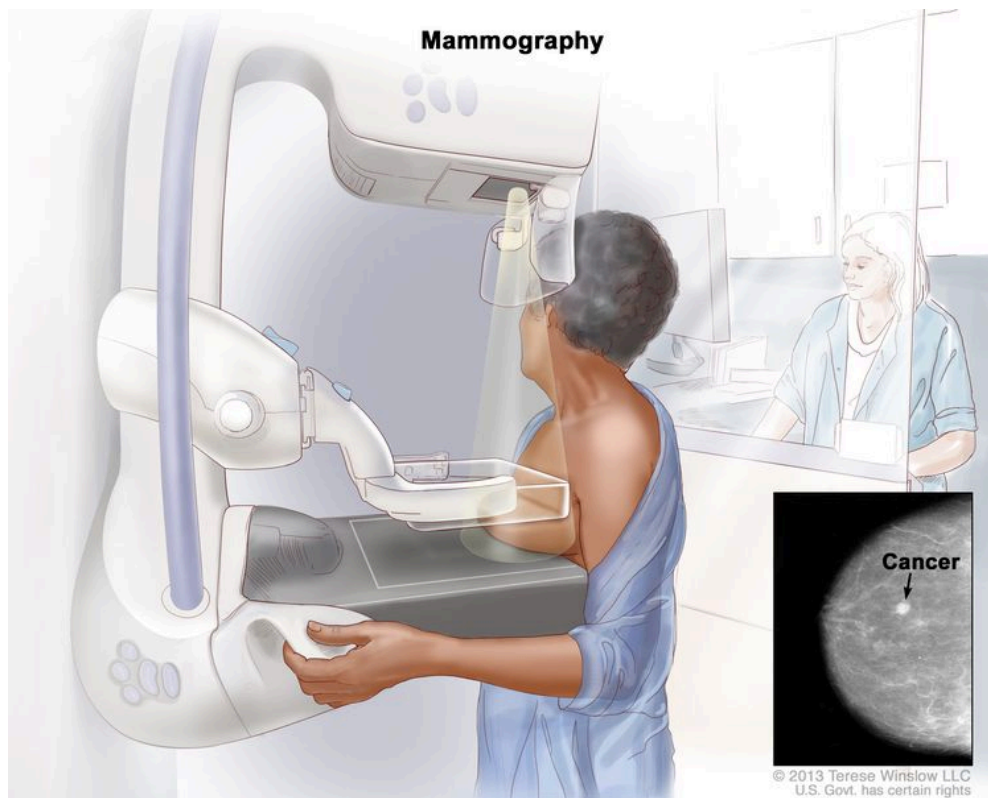
Breast exams should be part of prenatal and postnatal care.

To detect breast cancer, pregnant and nursing women should examine their breasts themselves. Women should also receive clinical breast exams during their regular prenatal and postnatal check-ups. Talk to your doctor if you notice any changes in your breasts that you do not expect or that worry you.

Tests that examine the breasts are used to diagnose breast cancer.

The following tests and procedures may be used:

- **Physical exam and health history:** An exam of the body to check general signs of health, including checking for signs of disease, such as lumps or anything else that seems unusual. A history of the patient's health habits and past illnesses and treatments will also be taken.
- **Clinical breast exam (CBE):** An exam of the breast by a doctor or other health professional. The doctor will carefully feel the breasts and under the arms for lumps or anything else that seems unusual.
- **Ultrasound exam:** A procedure in which high-energy sound waves (ultrasound) are bounced off internal tissues or organs and make echoes. The echoes form a picture of body tissues called a sonogram. The picture can be printed to look at later.
- **Mammogram:** An x-ray of the breast. A mammogram can be done with little risk to the fetus. Mammograms in pregnant women may appear negative even though cancer is present.



Mammography. The breast is pressed between two plates. X-rays are used to take pictures of breast tissue.

- **Biopsy:** The removal of cells or tissues so they can be viewed under a microscope by a pathologist to check for signs of cancer. If a lump in the breast is found, a biopsy may be done.

There are three types of breast biopsies:

- **Excisional biopsy:** The removal of an entire lump of tissue.
- **Core biopsy:** The removal of tissue using a wide needle.
- **Fine-needle aspiration (FNA) biopsy:** The removal of tissue or fluid, using a thin needle.

If cancer is found, tests are done to study the cancer cells.

Decisions about the best treatment are based on the results of these tests and the trimester of the pregnancy. The tests give information about:

- How quickly the cancer may grow.
- How likely it is that the cancer will spread to other parts of the body.
- How well certain treatments might work.
- How likely the cancer is to recur (come back).

Tests may include the following:

- **Estrogen and progesterone receptor test:** A test to measure the amount of estrogen and progesterone (hormones) receptors in cancer tissue. If there are more estrogen or progesterone receptors than normal, the cancer is called estrogen receptor positive or progesterone receptor positive. This type of breast cancer may grow more quickly. The test results show whether treatment to block estrogen and progesterone given after the baby is born may stop the cancer from growing.
- **Human epidermal growth factor type 2 receptor (HER2/neu) test:** A laboratory test to measure how many *HER2/neu* genes there are and how much HER2/neu protein is made in a sample of tissue. If there are more *HER2/neu* genes or higher levels of HER2/neu protein than normal, the cancer is called HER2/neu positive. This type of breast cancer may grow more quickly and is more likely to spread to other parts of the body. The cancer may be treated with drugs that target the HER2/neu protein, such as trastuzumab and pertuzumab, after the baby is born.
- **Multigene tests:** Tests in which samples of tissue are studied to look at the activity of many genes at the same time. These tests may help predict whether cancer will spread to other parts of the body or recur (come back).
 - **Oncotype DX:** This test helps predict whether stage I or stage II breast cancer that is estrogen receptor positive and node-negative will spread to other parts of the body. If the risk of the cancer spreading is high, chemotherapy may be given to lower the risk.
 - **MammaPrint:** A laboratory test in which the activity of 70 different genes is looked at in the breast cancer tissue of women who have early-stage invasive breast cancer that has not spread to lymph nodes or has spread to 3 or fewer lymph nodes. The activity level of these genes helps predict whether breast cancer will spread to other parts of the body or come back. If the test shows that the risk that the cancer will spread or come back is high, chemotherapy may be given to lower the risk.

Certain factors affect prognosis (chance of recovery) and treatment options.

The prognosis and treatment options depend on the following:

- The stage of the cancer (the size of the tumor and whether it is in the breast only or has spread to other parts of the body).
- The type of breast cancer.
- The trimester of the pregnancy.
- Whether there are signs or symptoms.
- The patient's general health.

Stages of Breast Cancer

KEY POINTS

- After breast cancer has been diagnosed, tests are done to find out if cancer cells have spread within the breast or to other parts of the body.
- There are three ways that cancer spreads in the body.
- Cancer may spread from where it began to other parts of the body.
- In breast cancer, stage is based on the size and location of the primary tumor, the spread of cancer to nearby lymph nodes or other parts of the body, tumor grade, and whether certain biomarkers are present.
- The TNM system is used to describe the size of the primary tumor and the spread of cancer to nearby lymph nodes or other parts of the body.
 - Tumor (T). The size and location of the tumor.
 - Lymph Node (N). The size and location of lymph nodes where cancer has spread.
 - Metastasis (M). The spread of cancer to other parts of the body.
- The grading system is used to describe how quickly a breast tumor is likely to grow and spread.
- Biomarker testing is used to find out whether breast cancer cells have certain receptors.
- The TNM system, the grading system, and biomarker status are combined to find out the breast cancer stage.
- Talk to your doctor to find out what your breast cancer stage is and how it is used to plan the best treatment for you.

After breast cancer has been diagnosed, tests are done to find out if cancer cells have spread within the breast or to other parts of the body.

The process used to find out if the cancer has spread within the breast or to other parts of the body is called staging. The information gathered from the staging process determines the stage of the disease. It is important to know the stage in order to plan treatment.

Some procedures may expose the fetus to harmful radiation or dyes. These procedures are done only if absolutely necessary. Certain actions, such as using a lead-lined shield to cover the abdomen, are used to help protect the fetus from radiation as much as possible.

The following tests and procedures may be used to stage breast cancer during pregnancy:

- **Chest x-ray:** An x-ray of the organs and bones inside the chest. An x-ray is a type of energy beam that can go through the body and onto film, making a picture of areas inside the body.
- **Bone scan:** A procedure to check if there are rapidly dividing cells, such as cancer cells, in the bone. A very small amount of radioactive material is injected into a vein and travels through the bloodstream. The radioactive material collects in bones with cancer and is detected by a scanner.
- **Ultrasound exam:** A procedure in which high-energy sound waves (ultrasound) are bounced off internal tissues or organs, such as the liver, and make echoes. The echoes form a picture of body tissues called a sonogram. The picture can be printed to be looked at later.
- **MRI (magnetic resonance imaging):** A procedure that uses a magnet, radio waves, and a computer to make a series of detailed pictures of areas inside the body, such as the brain. This procedure is also called nuclear magnetic resonance imaging (NMRI).

There are three ways that cancer spreads in the body.

Cancer can spread through tissue, the lymph system, and the blood:

- **Tissue.** The cancer spreads from where it began by growing into nearby areas.
- **Lymph system.** The cancer spreads from where it began by getting into the lymph system. The cancer travels through the lymph vessels to other parts of the body.
- **Blood.** The cancer spreads from where it began by getting into the blood. The cancer travels through the blood vessels to other parts of the body.

Cancer may spread from where it began to other parts of the body.

When cancer spreads to another part of the body, it is called metastasis. Cancer cells break away from where they began (the primary tumor) and travel through the lymph system or blood.

- **Lymph system.** The cancer gets into the lymph system, travels through the lymph vessels, and forms a tumor (metastatic tumor) in another part of the body.
- **Blood.** The cancer gets into the blood, travels through the blood vessels, and forms a tumor (metastatic tumor) in another part of the body.

The metastatic tumor is the same type of cancer as the primary tumor. For example, if breast cancer spreads to the bone, the cancer cells in the bone are actually breast cancer cells. The disease is metastatic breast cancer, not bone cancer.

Metastasis: How Cancer Spreads



Many cancer deaths are caused when cancer moves from the original tumor and spreads to other tissues and organs. This is called metastatic cancer. This animation shows how cancer cells travel from the place in the body where they first formed to other parts of the body.

In breast cancer, stage is based on the size and location of the primary tumor, the spread of cancer to nearby lymph nodes or other parts of the body, tumor grade, and whether certain biomarkers are present.

To plan the best treatment and understand your prognosis, it is important to know the breast cancer stage.

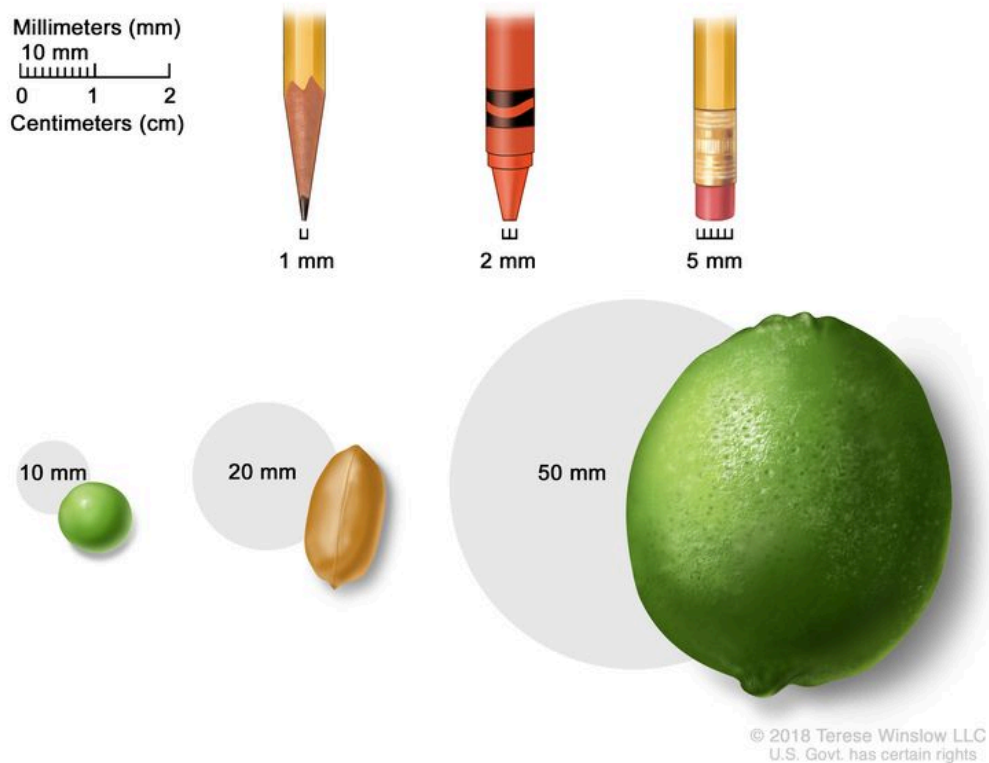
There are 3 types of breast cancer stage groups:

- **Clinical Prognostic Stage** is used first to assign a stage for **all** patients based on health history, physical exam, imaging tests (if done), and biopsies. The Clinical Prognostic Stage is described by the TNM system, tumor grade, and biomarker status (ER, PR, HER2). In clinical staging, mammography or ultrasound is used to check the lymph nodes for signs of cancer.
- **Pathological Prognostic Stage** is then used for patients who have surgery as their first treatment. The Pathological Prognostic Stage is based on all clinical information, biomarker status, and laboratory test results from breast tissue and lymph nodes removed during surgery.
- **Anatomic Stage** is based on the size and the spread of cancer as described by the TNM system. The Anatomic Stage is used in parts of the world where biomarker testing is not available. It is not used in the United States.

The TNM system is used to describe the size of the primary tumor and the spread of cancer to nearby lymph nodes or other parts of the body.

For breast cancer, the TNM system describes the tumor as follows:

Tumor (T). The size and location of the tumor.



Tumor sizes are often measured in millimeters (mm) or centimeters. Common items that can be used to show tumor size in mm include: a sharp pencil point (1 mm), a new crayon point (2 mm), a pencil-top eraser (5 mm), a pea (10 mm), a peanut (20 mm), and a lime (50 mm).

- TX: Primary tumor cannot be assessed.
- T0: No sign of a primary tumor in the breast.
- Tis: Carcinoma in situ. There are 2 types of breast carcinoma in situ:
 - Tis (DCIS): DCIS is a condition in which abnormal cells are found in the lining of a breast duct. The abnormal cells have not spread outside the duct to other tissues in the breast. In some cases, DCIS may become invasive breast cancer that is able to spread to other tissues. At this time, there is no way to know which lesions can become invasive.
 - Tis (Paget disease): Paget disease of the nipple is a condition in which abnormal cells are found in the skin cells of the nipple and may spread to the areola. It is not staged according to the TNM system. If Paget disease AND an invasive breast cancer are present, the TNM system is used to stage the invasive breast cancer.

- T1: The tumor is 20 millimeters or smaller. There are 4 subtypes of a T1 tumor depending on the size of the tumor:
 - T1mi: the tumor is 1 millimeter or smaller.
 - T1a: the tumor is larger than 1 millimeter but not larger than 5 millimeters.
 - T1b: the tumor is larger than 5 millimeters but not larger than 10 millimeters.
 - T1c: the tumor is larger than 10 millimeters but not larger than 20 millimeters.
- T2: The tumor is larger than 20 millimeters but not larger than 50 millimeters.
- T3: The tumor is larger than 50 millimeters.
- T4: The tumor is described as one of the following:
 - T4a: the tumor has grown into the chest wall.
 - T4b: the tumor has grown into the skin—an ulcer has formed on the surface of the skin on the breast, small tumor nodules have formed in the same breast as the primary tumor, and/or there is swelling of the skin on the breast.
 - T4c: the tumor has grown into the chest wall and the skin.
 - T4d: inflammatory breast cancer—one-third or more of the skin on the breast is red and swollen (called peau d'orange).

Lymph Node (N). The size and location of lymph nodes where cancer has spread.

When the lymph nodes are removed by surgery and studied under a microscope by a pathologist, pathologic staging is used to describe the lymph nodes. The pathologic staging of lymph nodes is described below.

- NX: The lymph nodes cannot be assessed.
- N0: No sign of cancer in the lymph nodes, or tiny clusters of cancer cells not larger than 0.2 millimeters in the lymph nodes.
- N1: Cancer is described as one of the following:
 - N1mi: cancer has spread to the axillary (armpit area) lymph nodes and is larger than 0.2 millimeters but not larger than 2 millimeters.
 - N1a: cancer has spread to 1 to 3 axillary lymph nodes and the cancer in at least one of the lymph nodes is larger than 2 millimeters.
 - N1b: cancer has spread to lymph nodes near the breastbone on the same side of the body as the primary tumor, and the cancer is larger than 0.2 millimeters and is found by sentinel lymph node biopsy. Cancer is not found in the axillary lymph nodes.
 - N1c: cancer has spread to 1 to 3 axillary lymph nodes and the cancer in at least one of the lymph nodes is larger than 2 millimeters. Cancer is also found by sentinel

lymph node biopsy in the lymph nodes near the breastbone on the same side of the body as the primary tumor.

- N2: Cancer is described as one of the following:
 - N2a: cancer has spread to 4 to 9 axillary lymph nodes and the cancer in at least one of the lymph nodes is larger than 2 millimeters.
 - N2b: cancer has spread to lymph nodes near the breastbone and the cancer is found by imaging tests. Cancer is not found in the axillary lymph nodes by sentinel lymph node biopsy or lymph node dissection.
- N3: Cancer is described as one of the following:
 - N3a: cancer has spread to 10 or more axillary lymph nodes and the cancer in at least one of the lymph nodes is larger than 2 millimeters, or cancer has spread to lymph nodes below the collarbone.
 - N3b: cancer has spread to 1 to 9 axillary lymph nodes and the cancer in at least one of the lymph nodes is larger than 2 millimeters. Cancer has also spread to lymph nodes near the breastbone and the cancer is found by imaging tests;

or

cancer has spread to 4 to 9 axillary lymph nodes and cancer in at least one of the lymph nodes is larger than 2 millimeters. Cancer has also spread to lymph nodes near the breastbone on the same side of the body as the primary tumor, and the cancer is larger than 0.2 millimeters and is found by sentinel lymph node biopsy.

- N3c: cancer has spread to lymph nodes above the collarbone on the same side of the body as the primary tumor.

When the lymph nodes are checked using mammography or ultrasound, it is called clinical staging. The clinical staging of lymph nodes is not described here.

Metastasis (M). The spread of cancer to other parts of the body.

- M0: There is no sign that cancer has spread to other parts of the body.
- M1: Cancer has spread to other parts of the body, most often the bones, lungs, liver, or brain. If cancer has spread to distant lymph nodes, the cancer in the lymph nodes is larger than 0.2 millimeters. The cancer is called metastatic breast cancer.

The grading system is used to describe how quickly a breast tumor is likely to grow and spread.

The grading system describes a tumor based on how abnormal the cancer cells and tissue look under a microscope and how quickly the cancer cells are likely to grow and spread. Low-grade cancer cells look more like normal cells and tend to grow and spread more

slowly than high-grade cancer cells. To describe how abnormal the cancer cells and tissue are, the pathologist will assess the following three features:

- How much of the tumor tissue has normal breast ducts.
- The size and shape of the nuclei in the tumor cells.
- How many dividing cells are present, which is a measure of how fast the tumor cells are growing and dividing.

For each feature, the pathologist assigns a score of 1 to 3; a score of “1” means the cells and tumor tissue look the most like normal cells and tissue, and a score of “3” means the cells and tissue look the most abnormal. The scores for each feature are added together to get a total score between 3 and 9.

Three grades are possible:

- Total score of 3 to 5: G1 (Low grade or well differentiated).
- Total score of 6 to 7: G2 (Intermediate grade or moderately differentiated).
- Total score of 8 to 9: G3 (High grade or poorly differentiated).

Biomarker testing is used to find out whether breast cancer cells have certain receptors.

Healthy breast cells, and some breast cancer cells, have receptors (biomarkers) that attach to the hormones estrogen and progesterone. These hormones are needed for healthy cells, and some breast cancer cells, to grow and divide. To check for these biomarkers, samples of tissue containing breast cancer cells are removed during a biopsy or surgery. The samples are tested in a laboratory to see whether the breast cancer cells have estrogen or progesterone receptors.

Another type of receptor (biomarker) that is found on the surface of all breast cancer cells is called HER2. HER2 receptors are needed for the breast cancer cells to grow and divide.

For breast cancer, biomarker testing includes the following:

- **Estrogen receptor (ER).** If the breast cancer cells have estrogen receptors, the cancer cells are called ER positive (ER+). If the breast cancer cells do not have estrogen receptors, the cancer cells are called ER negative (ER-).
- **Progesterone receptor (PR).** If the breast cancer cells have progesterone receptors, the cancer cells are called PR positive (PR+). If the breast cancer cells do not have progesterone receptors, the cancer cells are called PR negative (PR-).
- **Human epidermal growth factor type 2 receptor (HER2/neu or HER2).** If the breast cancer cells have larger than normal amounts of HER2 receptors on their surface, the cancer cells are called HER2 positive (HER2+). If the breast cancer cells have a normal

amount of HER2 on their surface, the cancer cells are called HER2 negative (HER2-).
HER2+ breast cancer is more likely to grow and divide faster than HER2- breast cancer.

Sometimes the breast cancer cells will be described as triple negative or triple positive.

- **Triple negative.** If the breast cancer cells do not have estrogen receptors, progesterone receptors, or a larger than normal amount of HER2 receptors, the cancer cells are called triple negative.
- **Triple positive.** If the breast cancer cells do have estrogen receptors, progesterone receptors, and a larger than normal amount of HER2 receptors, the cancer cells are called triple positive.

It is important to know the estrogen receptor, progesterone receptor, and HER2 receptor status to choose the best treatment. There are drugs that can stop the receptors from attaching to the hormones estrogen and progesterone and stop the cancer from growing. Other drugs may be used to block the HER2 receptors on the surface of the breast cancer cells and stop the cancer from growing.

The TNM system, the grading system, and biomarker status are combined to find out the breast cancer stage.

Here are 3 examples that combine the TNM system, the grading system, and the biomarker status to find out the Pathological Prognostic breast cancer stage for a woman whose first treatment was surgery:

If the tumor size is 30 millimeters (T2), has not spread to nearby lymph nodes (N0), has not spread to distant parts of the body (M0), and is:

- Grade 1
- HER2+
- ER-
- PR-

The cancer is stage IIA.

If the tumor size is 53 millimeters (T3), has spread to 4 to 9 axillary lymph nodes (N2), has not spread to other parts of the body (M0), and is:

- Grade 2
- HER2+
- ER+
- PR-

The tumor is stage IIIA.

If the tumor size is 65 millimeters (T3), has spread to 3 axillary lymph nodes (N1a), has spread to the lungs (M1), and is:

- Grade 1
- HER2+
- ER-
- PR-

The cancer is stage IV (metastatic breast cancer).

Talk to your doctor to find out what your breast cancer stage is and how it is used to plan the best treatment for you.

After surgery, your doctor will receive a pathology report that describes the size and location of the primary tumor, the spread of cancer to nearby lymph nodes, tumor grade, and whether certain biomarkers are present. The pathology report and other test results are used to determine your breast cancer stage.

You are likely to have many questions. Ask your doctor to explain how staging is used to decide the best options to treat your cancer and whether there are clinical trials that might be right for you.

Treatment Option Overview

KEY POINTS

- Treatment options for pregnant women depend on the stage of the disease and the trimester of the pregnancy.
- Three types of standard treatment are used:
 - Surgery
 - Radiation therapy
 - Chemotherapy
- Ending the pregnancy does not seem to improve the mother's chance of survival.
- Treatment for breast cancer may cause side effects.

Treatment options for pregnant women depend on the stage of the disease and the trimester of the pregnancy.

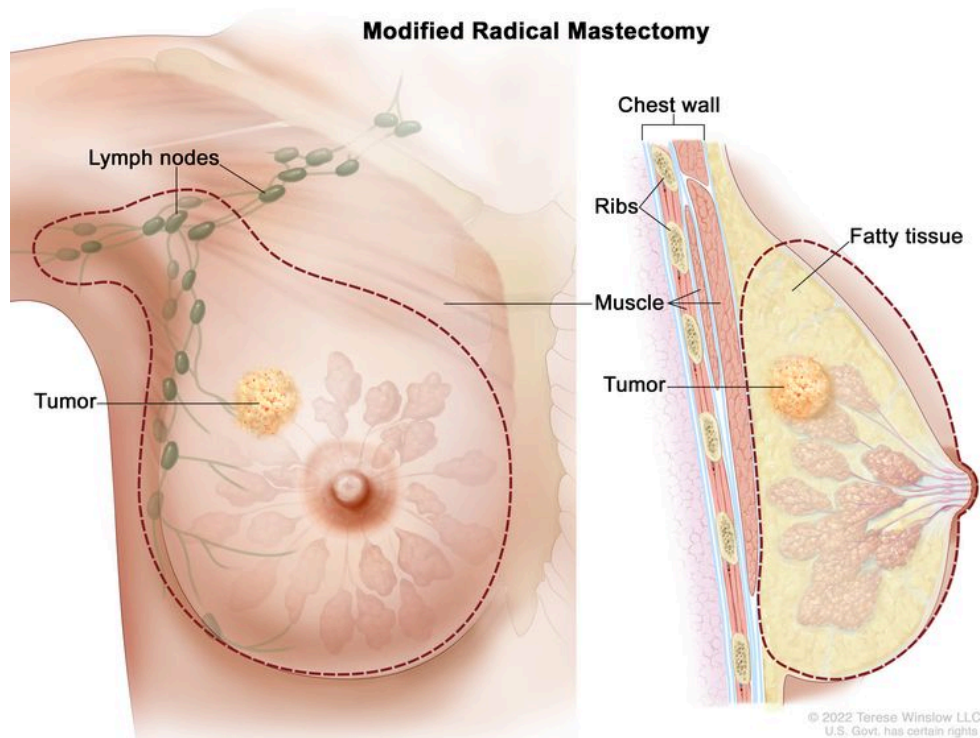
Three types of standard treatment are used:

Surgery

Most pregnant women with breast cancer have surgery to remove the breast. Some of the lymph nodes under the arm may be removed so they can be checked under a microscope by a pathologist for signs of cancer.

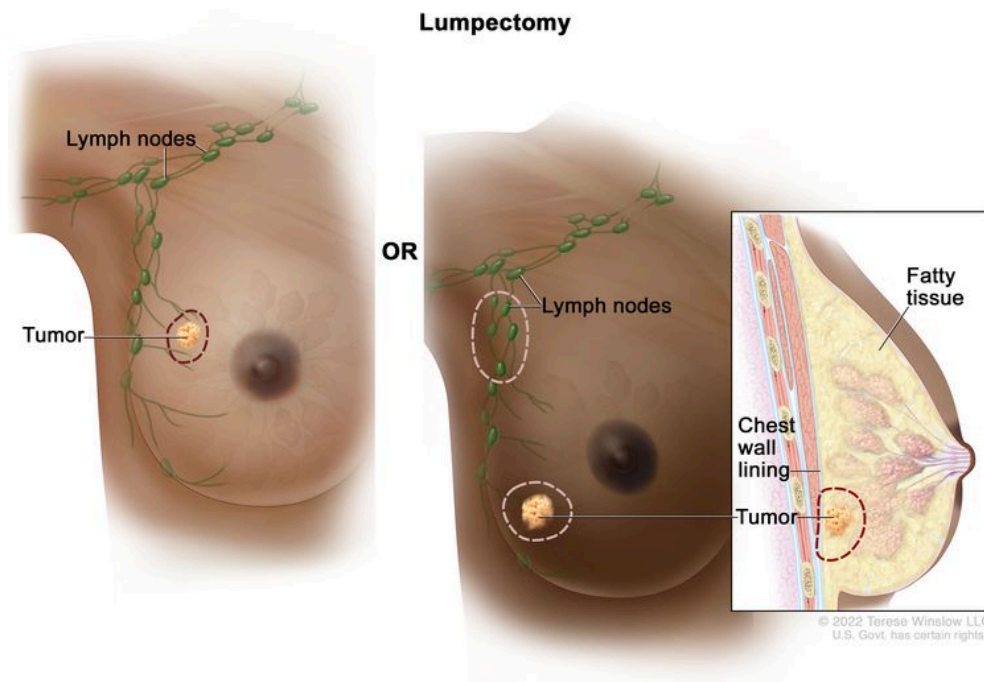
Types of surgery to remove the cancer include:

- **Modified radical mastectomy:** Surgery to remove the whole breast that has cancer. This may include removal of the nipple, areola (the dark-colored skin around the nipple), and skin over the breast. Most of the lymph nodes under the arm are also removed.



Modified radical mastectomy. The whole breast and most of the lymph nodes under the arm are removed.

- **Breast-conserving surgery:** Surgery to remove the cancer and some normal tissue around it, but not the breast itself. Part of the chest wall lining may also be removed if the cancer is near it. This type of surgery may also be called lumpectomy, partial mastectomy, segmental mastectomy, quadrantectomy, or breast-sparing surgery.



Lumpectomy. The tumor and some normal tissue around it are removed, but not the breast itself. Some lymph nodes under the arm may also be removed. If the cancer is near the chest wall, part of the chest wall lining may be removed as well.

After the doctor removes all of the cancer that can be seen at the time of surgery, some patients may be given chemotherapy or radiation therapy after surgery to kill any cancer cells that are left. For pregnant women with early-stage breast cancer, radiation therapy and hormone therapy are given after the baby is born. Treatment given after surgery, to lower the risk that the cancer will come back, is called adjuvant therapy.

Radiation therapy

Radiation therapy is a cancer treatment that uses high-energy x-rays or other types of radiation to kill cancer cells or keep them from growing. External radiation therapy uses a machine outside the body to send radiation toward the area of the body with cancer.

External radiation therapy may be given to pregnant women with early stage (stage I or II) breast cancer after the baby is born. Women with late stage (stage III or IV) breast cancer may be given external radiation therapy after the first 3 months of pregnancy or, if possible, radiation therapy is delayed until after the baby is born.

Chemotherapy

Chemotherapy is a cancer treatment that uses drugs to stop the growth of cancer cells, either by killing the cells or by stopping the cells from dividing. When chemotherapy is taken by mouth or injected into a vein or muscle, the drugs enter the bloodstream and can reach cancer cells throughout the body (systemic chemotherapy).

Chemotherapy is usually not given during the first 3 months of pregnancy. Chemotherapy given after this time does not usually harm the fetus but may cause early labor or low birth weight.

See [Drugs Approved for Breast Cancer](#) for more information.

Ending the pregnancy does not seem to improve the mother's chance of survival.

Because ending the pregnancy is not likely to improve the mother's chance of survival, it is not usually a treatment option.

Treatment for breast cancer may cause side effects.

For information about side effects caused by treatment for cancer, visit our [Side Effects](#) page.

Treatment of Early Stage Breast Cancer During Pregnancy

For information about the treatments listed below, see the [Treatment Option Overview](#) section.

Pregnant women with early-stage breast cancer (stage I and stage II) are usually treated in the same way as patients who are not pregnant, with some changes to protect the fetus. Treatment may include the following:

- Modified radical mastectomy, if the breast cancer was diagnosed early in pregnancy.
- Breast-conserving surgery, if the breast cancer is diagnosed later in pregnancy. Radiation therapy may be given after the baby is born.
- Modified radical mastectomy or breast-conserving surgery during pregnancy. After the first 3 months of pregnancy, certain types of chemotherapy may be given before or after surgery.

Hormone therapy and trastuzumab should not be given during pregnancy.

Use our [clinical trial search](#) to find NCI-supported cancer clinical trials that are accepting patients. You can search for trials based on the type of cancer, the age of the patient, and where the trials are being done. [General information](#) about clinical trials is also available.

Treatment of Late-Stage Breast Cancer During Pregnancy

For information about the treatments listed below, see the [Treatment Option Overview](#) section.

There is no standard treatment for patients with late-stage breast cancer (stage III or stage IV) during pregnancy. Treatment may include the following:

- Radiation therapy.
- Chemotherapy.

Radiation therapy and chemotherapy should not be given during the first 3 months of pregnancy.

Use our [clinical trial search](#) to find NCI-supported cancer clinical trials that are accepting patients. You can search for trials based on the type of cancer, the age of the patient, and where the trials are being done. [General information](#) about clinical trials is also available.

Special Issues About Breast Cancer During Pregnancy

KEY POINTS

- Lactation (breast milk production) and breast-feeding should be stopped if surgery or chemotherapy is planned.
- Breast cancer does not appear to harm the fetus.
- Pregnancy does not seem to affect the survival of women who have had breast cancer in the past.

Lactation (breast milk production) and breast-feeding should be stopped if surgery or chemotherapy is planned.

If surgery is planned, breast-feeding should be stopped to reduce blood flow in the breasts and make them smaller. Many chemotherapy drugs, especially cyclophosphamide and methotrexate, may occur in high levels in breast milk and may harm the nursing baby. Women receiving chemotherapy should not breast-feed.

Stopping lactation does not improve the mother's prognosis.

Breast cancer does not appear to harm the fetus.

Breast cancer cells do not seem to pass from the mother to the fetus.

Pregnancy does not seem to affect the survival of women who have had breast cancer in the past.

For women who have had breast cancer, pregnancy does not seem to affect their survival. However, some doctors recommend that a woman wait 2 years after treatment for breast cancer before trying to have a baby, so that any early return of the cancer would be detected. This may affect a woman's decision to become pregnant.

To Learn More About Breast Cancer During Pregnancy

For more information from the National Cancer Institute about breast cancer during pregnancy, see the following:

- [Breast Cancer Home Page](#)
- [Breast Cancer Prevention](#)
- [Breast Cancer Screening](#)
- [Surgery Choices for Women with DCIS or Breast Cancer](#)
- [Dense Breasts: Answers to Commonly Asked Questions](#)
- [Drugs Approved for Breast Cancer](#)

For general cancer information and other resources from the National Cancer Institute, visit:

- [About Cancer](#)
- [Cancer Staging](#)
- [Chemotherapy and You: Support for People With Cancer](#)
- [Radiation Therapy and You: Support for People With Cancer](#)
- [Coping with Cancer](#)
- [Questions to Ask Your Doctor about Cancer](#)
- [For Survivors, Caregivers, and Advocates](#)

About This PDQ Summary

About PDQ

Physician Data Query (PDQ) is the National Cancer Institute's (NCI's) comprehensive cancer information database. The PDQ database contains summaries of the latest published information on cancer prevention, detection, genetics, treatment, supportive care, and complementary and alternative medicine. Most summaries come in two versions. The health professional versions have detailed information written in technical language. The patient versions are written in easy-to-understand, nontechnical language. Both versions

Breast Cancer Prevention (PDQ®)–Patient Version

[Go to Health Professional Version](#)

What is prevention?

Cancer prevention is action taken to lower the chance of getting cancer. By preventing cancer, the number of new cases of cancer in a group or population is lowered. Hopefully, this will reduce the burden of cancer and lower the number of deaths caused by cancer.

Cancer is not a single disease but a group of related diseases. Our genes, lifestyle, and the environment around us work together to increase or decrease our risk of getting cancer. Each person's cancer risk is made up of a combination of these factors.

Anything that increases your chance of developing cancer is called a cancer risk factor; anything that decreases your chance of developing cancer is called a cancer protective factor.

Some risk factors for cancer can be avoided, but many cannot. For example, both smoking and inheriting certain genes are risk factors for some types of cancer, but only smoking can be avoided. Regular exercise and a healthy diet may be protective factors for some types of cancer. Avoiding risk factors and increasing protective factors may lower your risk but it does not mean that you will not get cancer.

Different ways to prevent cancer are being studied, including:

- Changing lifestyle or eating habits.
- Avoiding things known to cause cancer.
- Taking medicine to treat a precancerous condition or to keep cancer from starting.
- Risk-reducing surgery.

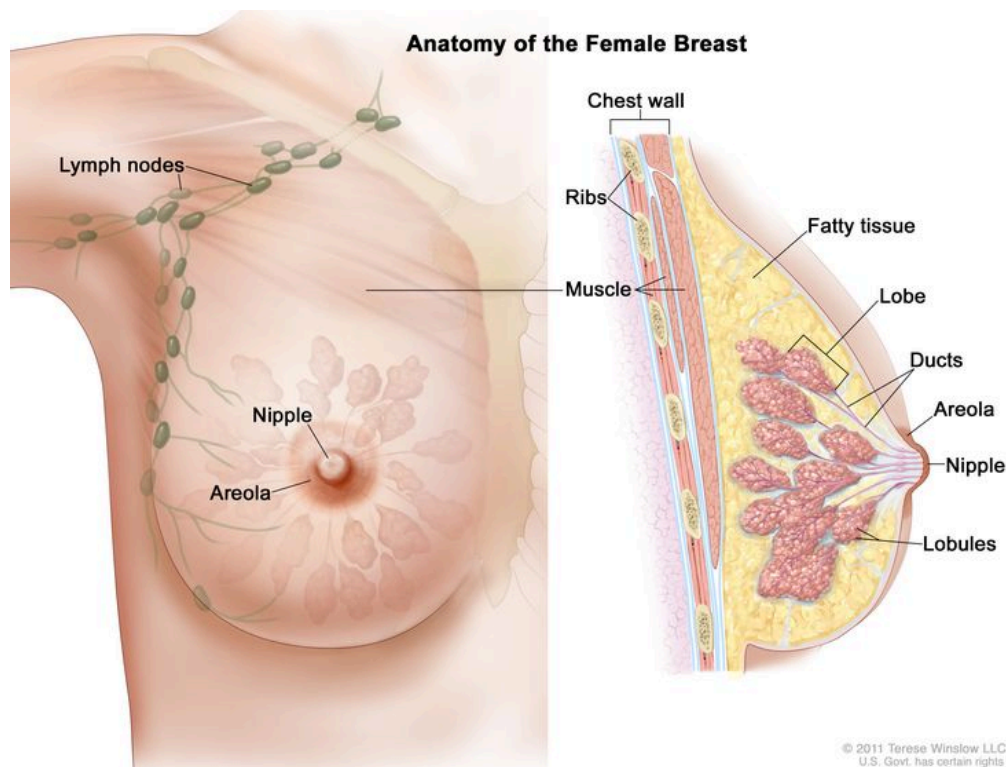
General Information About Breast Cancer

KEY POINTS

- Breast cancer is a disease in which malignant (cancer) cells form in the tissues of the breast.
- Breast cancer is the second most common type of cancer in American women.

Breast cancer is a disease in which malignant (cancer) cells form in the tissues of the breast.

The breast is made up of lobes and ducts. Each breast has 15 to 20 sections called lobes, which have many smaller sections called lobules. Lobules end in dozens of tiny bulbs that can make milk. The lobes, lobules, and bulbs are linked by thin tubes called ducts.



Anatomy of the female breast. The nipple and areola are shown on the outside of the breast. The lymph nodes, lobes, lobules, ducts, and other parts of the inside of the breast are also shown.

Each breast also has blood vessels and lymph vessels. The lymph vessels carry an almost colorless, watery fluid called lymph. Lymph vessels carry lymph between lymph nodes. Lymph nodes are small, bean-shaped structures that filter lymph and store white blood cells that help fight infection and disease. Groups of lymph nodes are found near the breast in the axilla (under the arm), above the collarbone, and in the chest.

See the following PDQ summaries for more information about breast cancer:

- [Breast Cancer Screening](#)
- [Breast Cancer Treatment \(Adult\)](#)

- [Breast Cancer Treatment During Pregnancy](#)
- [Male Breast Cancer Treatment](#)
- [Genetics of Breast and Ovarian Cancer](#)

Breast cancer is the second most common type of cancer in American women.

Women in the United States get breast cancer more than any other type of cancer except skin cancer. Breast cancer is second to lung cancer as a cause of cancer death in American women. Breast cancer rates in women increased gradually for many years until the early 2000s and then decreased rapidly, coinciding with a drop in postmenopausal hormone therapy use. Deaths from breast cancer have declined by 42% as of 2019; however, breast cancer deaths in Black women remain 41% higher than in White women. Breast cancer also occurs in men, but the number of new cases is small.

Breast Cancer Prevention

KEY POINTS

- Avoiding risk factors and increasing protective factors may help prevent cancer.
- The following are risk factors for breast cancer:
 - Older age
 - A personal history of breast cancer or benign (noncancer) breast disease
 - Inherited risk of breast cancer
 - Dense breast tissue
 - Reproductive history resulting in greater exposure to estrogen
 - Taking hormone therapy for symptoms of menopause
 - Radiation therapy to the breast or chest
 - Obesity
 - Drinking alcohol
- The following are *protective* factors for breast cancer:
 - Reproductive history resulting in less exposure to estrogen
 - Taking selective estrogen receptor modulators or aromatase inhibitors and inactivators
 - Selective estrogen receptor modulators
 - Aromatase inhibitors and inactivators

- Risk-reducing or prophylactic mastectomy
- Ovarian ablation
- Getting enough exercise
- It is not clear whether the following affect the risk of breast cancer:
 - Hormonal contraceptives
 - Chemicals in the environment
- Studies have shown that some factors have little or no effect on the risk of breast cancer.
- Cancer prevention clinical trials are used to study ways to prevent cancer.
- New ways to prevent breast cancer are being studied in clinical trials.

Avoiding risk factors and increasing protective factors may help prevent cancer.

Avoiding cancer risk factors may help prevent certain cancers. Risk factors include smoking, having overweight, and not getting enough exercise. Increasing protective factors such as quitting smoking and exercising may also help prevent some cancers. Talk to your doctor or other health care professional about how you might lower your risk of cancer.

NCI's [Breast Cancer Risk Assessment Tool](#) uses a woman's risk factors to estimate her risk for breast cancer during the next five years and up to age 90. This online tool is meant to be used by a health care provider. For more information on breast cancer risk, call 1-800-4-CANCER.

The following are risk factors for breast cancer:

Older age

Besides being a woman, older age is the main risk factor for breast cancer. The chance of getting breast cancer increases as a woman gets older. A 30-year-old woman has about a 1 in 200 chance of being diagnosed with breast cancer in the next 10 years, while a 70-year-old woman has a 1 in 25 chance.

Women aged 50 to 69 years who have screening mammograms have a lower chance of dying from breast cancer than women who do not have screening mammograms. Screening by mammography decreases breast cancer mortality by identifying cases for treatment at an earlier stage.

A personal history of breast cancer or benign (noncancer) breast disease

Women with any of the following have an increased risk of breast cancer:

- A personal history of invasive breast cancer, ductal carcinoma in situ (DCIS), or lobular carcinoma in situ (LCIS).
- A personal history of benign (noncancer) breast disease.

Inherited risk of breast cancer

Women with a family history of breast cancer in a first-degree relative (mother, sister, or daughter) have an increased risk of breast cancer.

Women who have inherited changes in the *BRCA1* and *BRCA2* genes or in certain other genes have a higher risk of breast cancer. The risk of breast cancer caused by inherited gene changes depends on the type of gene mutation, family history of cancer, and other factors.

Dense breast tissue

Having breast tissue that is dense on a mammogram is a factor in breast cancer risk. The level of risk depends on how dense the breast tissue is. Women with very dense breasts have a higher risk of breast cancer than women with low breast density.

Increased breast density is often an inherited trait, but it may also occur in women who have not had children, have a first pregnancy late in life, take postmenopausal hormones, or drink alcohol. For more information, see [Dense Breasts: Answers to Commonly Asked Questions](#).

Reproductive history resulting in greater exposure to estrogen

Estrogen is a hormone made by the body. It helps the body develop and maintain female sex characteristics. Being exposed to estrogen over a long time may increase the risk of breast cancer. Estrogen levels are highest during the years a woman is menstruating.

The following factors in a woman's reproductive history increase the length of time her breast tissue is exposed to estrogen and may increase the risk of breast cancer:

- **Early menstruation:** Beginning to have menstrual periods before age 12 increases the number of years the breast tissue is exposed to estrogen.
- **Starting menopause at a later age:** The more years a woman menstruates, the longer her breast tissue is exposed to estrogen.
- **Older age at birth of first child or never having given birth:** Pregnancy lowers a woman's lifetime number of menstrual cycles. Breast tissue is exposed to more estrogen for longer periods of time in women who become pregnant for the first time after age 35 or who never become pregnant.

Taking hormone therapy for symptoms of menopause

Hormones, such as estrogen and progesterone, can be made into a pill form in a laboratory. Estrogen, progestin, or both may be given to replace the estrogen no longer made by the

ovaries in postmenopausal women or women who have had their ovaries removed. This is called hormone replacement therapy (HRT) or hormone therapy (HT). Estrogen therapy that began close to the time of menopause is associated with an increased risk of developing breast cancer. Estrogen therapy that began at or after menopause is associated with an increased risk of developing endometrial cancer and total cardiovascular disease, especially stroke. The risk of breast cancer does not decrease after women stop taking estrogen. Combination HT is estrogen combined with progestin. This type of MHT increases the risk of breast cancer. Studies show that when women stop taking estrogen combined with progestin, the risk of breast cancer decreases.

Radiation therapy to the breast or chest

Radiation therapy to the chest for the treatment of cancer increases the risk of breast cancer, starting 10 years after treatment. The risk of breast cancer depends on the dose of radiation and the age at which it is given. The risk is highest if radiation treatment was used during puberty, when breasts are forming.

Radiation therapy to treat cancer in one breast does not appear to increase the risk of cancer in the other breast.

For women who have inherited changes in the *BRCA1* and *BRCA2* genes, exposure to radiation, such as that from chest x-rays, may further increase the risk of breast cancer, especially in women who were x-rayed before 20 years of age.

Obesity

Obesity increases the risk of breast cancer, especially in postmenopausal women who have not used hormone replacement therapy.

Drinking alcohol

Drinking alcohol increases the risk of breast cancer. The level of risk rises as the amount of alcohol consumed rises.

The following are *protective* factors for breast cancer:

Reproductive history resulting in less exposure to estrogen

A woman's reproductive history can affect the length of time her breast tissue is exposed to estrogen. Early onset of menstruation, late onset of menopause, later age at first pregnancy, and never having given birth have been linked to an increase in estrogen exposure and breast cancer risk. The following reproductive factors decrease the length of time a woman's breast tissue is exposed to estrogen and may help prevent breast cancer:

- **Early pregnancy:** Estrogen levels are lower during pregnancy. In one study, women who had a full-term pregnancy before age 20 had a lower risk of breast cancer than women who did not have children or who gave birth to their first child after age 35.

- **Breast-feeding:** Estrogen levels may remain lower while a woman is breast-feeding. Women who breastfed have a lower risk of breast cancer than women who have had children but did not breastfeed.

Taking selective estrogen receptor modulators or aromatase inhibitors and inactivators

Selective estrogen receptor modulators

Tamoxifen and raloxifene belong to the family of drugs called selective estrogen receptor modulators (SERMs). SERMs act like estrogen on some tissues in the body, but block the effect of estrogen on other tissues.

Treatment with tamoxifen lowers the risk of estrogen receptor-positive (ER-positive) breast cancer and ductal carcinoma *in situ* in premenopausal and postmenopausal women at high risk. Tamoxifen is also used to treat metastatic breast cancer and to prevent cancer from recurring after surgery to remove breast tumors. Treatment with raloxifene also lowers the risk of breast cancer in postmenopausal women. With either drug, the reduced risk lasts for several years or longer after treatment is stopped. Lower rates of broken bones have been noted in patients taking raloxifene.

Taking tamoxifen increases the risk of hot flashes, endometrial cancer, stroke, cataracts, and blood clots (especially in the lungs and legs). The risk of having these problems increases markedly in women older than 50 years compared with younger women. Women younger than 50 years who have a high risk of breast cancer may benefit the most from taking tamoxifen. The risk of endometrial cancer lasts for 5 years after tamoxifen is stopped, but the risk of cataracts or blood clots does not last long.. Talk with your doctor about the risks and benefits of taking this drug.

Taking raloxifene increases the risk of blood clots in the lungs and legs but does not appear to increase the risk of endometrial cancer. In postmenopausal women with osteoporosis (decreased bone density), raloxifene lowers the risk of breast cancer for women who have a high or low risk of breast cancer. It is not known if raloxifene would have the same effect in women who do not have osteoporosis. Talk with your doctor about the risks and benefits of taking this drug.

Other SERMs are being studied in clinical trials.

Aromatase inhibitors and inactivators

Aromatase inhibitors (anastrozole, letrozole) and inactivators (exemestane) lower the risk of recurrence and of new breast cancers in women who have a history of breast cancer. Aromatase inhibitors also decrease the risk of breast cancer in women with the following conditions:

- Postmenopausal women with a personal history of breast cancer.

- Women with no personal history of breast cancer who are 60 years and older, have a history of ductal carcinoma in situ with mastectomy, or have a high risk of breast cancer based on the Gail model tool (a tool used to estimate the risk of breast cancer).

In women with an increased risk of breast cancer, taking aromatase inhibitors decreases the amount of estrogen made by the body. Before menopause, estrogen is made by the ovaries and other tissues in a woman's body, including the brain, fat tissue, and skin. After menopause, the ovaries stop making estrogen, but the other tissues do not. Aromatase inhibitors block the action of an enzyme called aromatase, which is used to make all of the body's estrogen. Aromatase inactivators stop the enzyme from working.

Possible harms from taking aromatase inhibitors include muscle and joint pain, osteoporosis, hot flashes, and feeling very tired.

Risk-reducing or prophylactic mastectomy

Some women who have a high risk of breast cancer may choose to have a risk-reducing or prophylactic mastectomy (the removal of one or both breasts when there are no signs of cancer). After surgery, the risk of breast cancer becomes much lower in these women and most feel less anxious about their risk of breast cancer. Some women diagnosed with breast cancer may decide to have a healthy breast removed at the same time the breast with cancer is removed. This is called contralateral prophylactic mastectomy. However, it is very important to have a cancer risk assessment and counseling about the different ways to prevent breast cancer before making any decision about surgery.

Ovarian ablation

The ovaries make most of the estrogen that is made by the body. Treatments that stop or lower the amount of estrogen made by the ovaries include surgery to remove the ovaries, radiation therapy, or taking certain drugs. This is called ovarian ablation.

Premenopausal women who have a high risk of breast cancer due to certain changes in the *BRCA1* and *BRCA2* genes may choose to have a risk-reducing oophorectomy (the removal of both ovaries when there are no signs of cancer). This decreases the amount of estrogen made by the body and lowers the risk of breast cancer. Risk-reducing oophorectomy also lowers the risk of breast cancer in average-risk premenopausal women and in women with an increased risk of breast cancer due to radiation to the chest. However, it is very important to have a cancer risk assessment and counseling before making this decision. The sudden drop in estrogen levels may cause the symptoms of menopause to begin. These include hot flashes, trouble sleeping, anxiety, and depression. Long-term effects include decreased sex drive, vaginal dryness, and decreased bone density.

Getting enough exercise

Women who take part in physical exercise have a lower risk of breast cancer.

It is not clear whether the following affect the risk of breast cancer:

Hormonal contraceptives

Hormonal contraceptives contain estrogen or estrogen and progestin. Some studies have shown that women who are current or recent users of hormonal contraceptives may have a slight increase in breast cancer risk. Other studies have not shown an increased risk of breast cancer in women using hormonal contraceptives.

In one study, the risk of breast cancer slightly increased the longer a woman used hormonal contraceptives. Another study showed that the slight increase in breast cancer risk decreased over time when women stopped using hormonal contraceptives.

More studies are needed to know whether hormonal contraceptives affect a woman's risk of breast cancer.

Chemicals in the environment

Scientists are studying whether exposure to chemicals in the environment may increase a woman's risk of breast cancer. Studies of this kind can be difficult to conduct and interpret for many reasons:

- It is hard to determine the specific chemicals people have been exposed to in the past. It can take decades after a potential exposure before cancer develops, and a person may not be aware of or remember the past exposure.
- Even if a chemical is shown in a laboratory test to cause cancer, this does not necessarily mean it will cause cancer in people exposed to that chemical in the environment. A chemical may cause cancer when tested at high levels in laboratory studies but not at the lower levels seen in the environment.
- Individual chemicals are likely to cause only a small increase in risk, and it can be difficult to detect that increase in the context of the other factors that may influence a woman's risk of breast cancer.

These reasons make it hard to know which chemicals, if any, may increase the risk of breast cancer. More studies are needed to know whether chemicals in the environment affect a woman's risk of breast cancer. For more information, see [Environmental Carcinogens and Cancer Risk](#).

Studies have shown that some factors have little or no effect on the risk of breast cancer.

The following have little or no effect on the risk of breast cancer:

- Having an abortion.
- Making diet changes such as eating less fat or more fruits and vegetables.

- Taking vitamins, including fenretinide (a type of vitamin A).
- Cigarette smoking, both active and passive (inhaling secondhand smoke).
- Using underarm deodorant or antiperspirant.
- Taking statins (cholesterol-lowering drugs).
- Taking bisphosphonates (drugs used to treat osteoporosis and hypercalcemia) by mouth or by intravenous infusion.
- Changes in your circadian rhythm (physical, mental, and behavioral changes that are mainly affected by darkness and light in 24 hour cycles), which may be affected by working night shifts or the amount of light in your bedroom at night.

Cancer prevention clinical trials are used to study ways to prevent cancer.

Cancer prevention clinical trials are used to study ways to lower the risk of developing certain types of cancer. Some cancer prevention trials are conducted with healthy people who have not had cancer but who have an increased risk for cancer. Other prevention trials are conducted with people who have had cancer and are trying to prevent another cancer of the same type or to lower their chance of developing a new type of cancer. Other trials are done with healthy volunteers who are not known to have any risk factors for cancer.

The purpose of some cancer prevention clinical trials is to find out whether actions people take can prevent cancer. These may include exercising more or quitting smoking or taking certain medicines, supplements, vitamins, minerals, or food.

New ways to prevent breast cancer are being studied in clinical trials.

Information about clinical trials supported by NCI can be found on NCI's [clinical trials search](#) webpage. Clinical trials supported by other organizations can be found on the [ClinicalTrials.gov](#) website.

About This PDQ Summary

About PDQ

Physician Data Query (PDQ) is the National Cancer Institute's (NCI's) comprehensive cancer information database. The PDQ database contains summaries of the latest published information on cancer prevention, detection, genetics, treatment, supportive care, and complementary and alternative medicine. Most summaries come in two versions. The health professional versions have detailed information written in technical language. The patient versions are written in easy-to-understand, nontechnical language. Both versions

Breast Cancer Screening (PDQ®)–Patient Version

[Go to Health Professional Version](#)

What is screening?

Screening is looking for signs of disease, such as breast cancer, before a person has symptoms. The goal of screening tests is to find cancer at an early stage when it can be treated and may be cured. Sometimes a screening test finds cancer that is very small or very slow growing. These cancers are unlikely to cause death or illness during the person's lifetime.

Scientists are trying to better understand which people are more likely to get certain types of cancer. For example, they look at the person's age, their family history, and certain exposures during their lifetime. This information helps doctors recommend who should be screened for cancer, which screening tests should be used, and how often the tests should be done.

It is important to remember that your doctor does not necessarily think you have cancer if he or she suggests a screening test. Screening tests are done when you have no cancer symptoms. Women who have a strong family history or a personal history of cancer or other risk factors may also be offered genetic testing.

If a screening test result is abnormal, you may need to have more tests done to find out if you have cancer. These are called diagnostic tests, rather than screening tests.

For more information about cancer screening, see [Cancer Screening Overview](#).

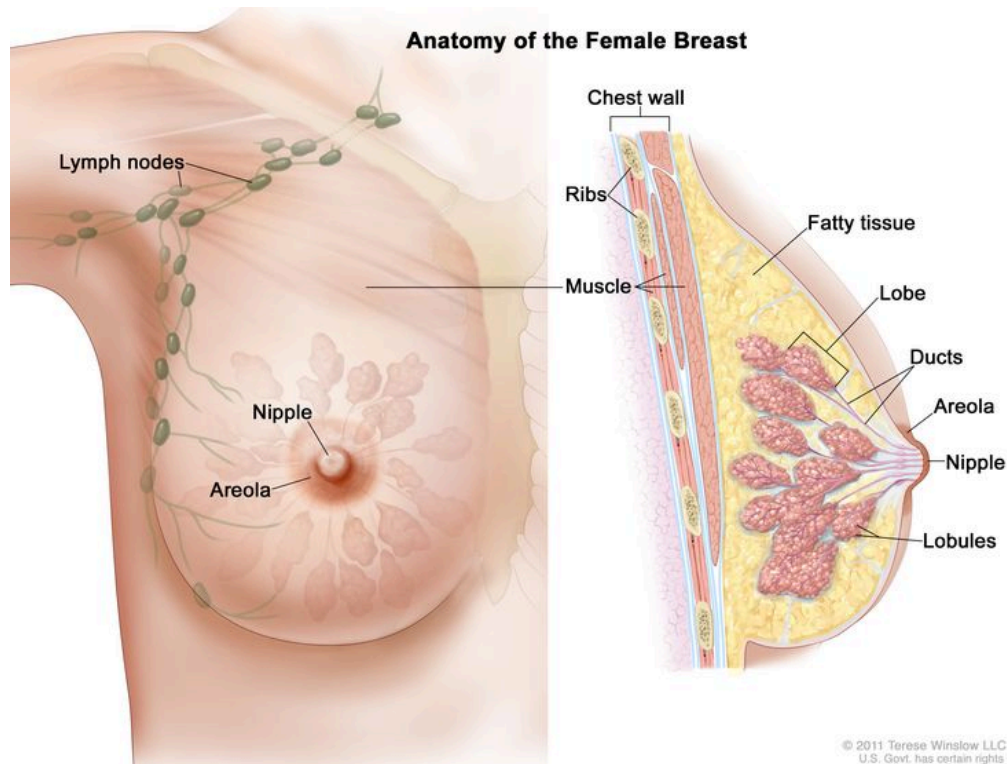
General Information About Breast Cancer

KEY POINTS

- Breast cancer is a disease in which malignant (cancer) cells form in the tissues of the breast.
- Breast cancer is the second leading cause of death from cancer in American women.
- Different factors increase or decrease the risk of breast cancer.

Breast cancer is a disease in which malignant (cancer) cells form in the tissues of the breast.

The breast is made up of lobes and ducts. Each breast has 15 to 20 sections called lobes, which have many smaller sections called lobules. Lobules end in dozens of tiny bulbs that can produce milk. The lobes, lobules, and bulbs are linked by thin tubes called ducts.



Anatomy of the female breast. The nipple and areola are shown on the outside of the breast. The lymph nodes, lobes, lobules, ducts, and other parts of the inside of the breast are also shown.

Each breast also has blood vessels and lymph vessels. The lymph vessels carry an almost colorless, watery fluid called lymph. Lymph vessels carry lymph between lymph nodes. Lymph nodes are small, bean-shaped structures that filter lymph and store white blood cells that help fight infection and disease. Groups of lymph nodes are found near the breast in the axilla (under the arm), above the collarbone, and in the chest.

For more information about breast cancer, see the following:

- [Breast Cancer Prevention](#)
- [Breast Cancer Treatment \(Adult\)](#)
- [Male Breast Cancer Treatment](#)
- [Genetics of Breast and Gynecologic Cancers](#)

Breast cancer is the second leading cause of death from cancer in American women.

Women in the United States get breast cancer more than any other type of cancer except for skin cancer.

Breast cancer is more likely to occur as a woman ages. It occurs more often in White women than in Black women, but Black women die from breast cancer more often than White women.

Breast cancer rarely occurs in men. Because men with breast cancer usually have a lump that can be felt, screening tests are not likely to be helpful.

Different factors increase or decrease the risk of breast cancer.

For information about risk factors and protective factors for breast cancer, see [Breast Cancer Prevention](#).

Breast Cancer Screening

KEY POINTS

- Tests are used to screen for different types of cancer when a person does not have symptoms.
- Mammography is the most common screening test for breast cancer.
- Magnetic resonance imaging (MRI) may be used to screen women who have a high risk of breast cancer.
- Whether a woman should be screened for breast cancer and the screening test to use depends on certain factors.
- Other screening tests have been or are being studied in clinical trials.
 - Breast Exam
 - Thermography
 - Tissue sampling
- Screening tests for breast cancer are being studied in clinical trials.

Tests are used to screen for different types of cancer when a person does not have symptoms.

Scientists study screening tests to find those with the fewest harms and most benefits. Cancer screening trials also are meant to show whether early detection (finding cancer

before it causes symptoms) helps a person live longer or decreases a person's chance of dying from the disease. For some types of cancer, the chance of recovery is better if the disease is found and treated at an early stage.

Mammography is the most common screening test for breast cancer.

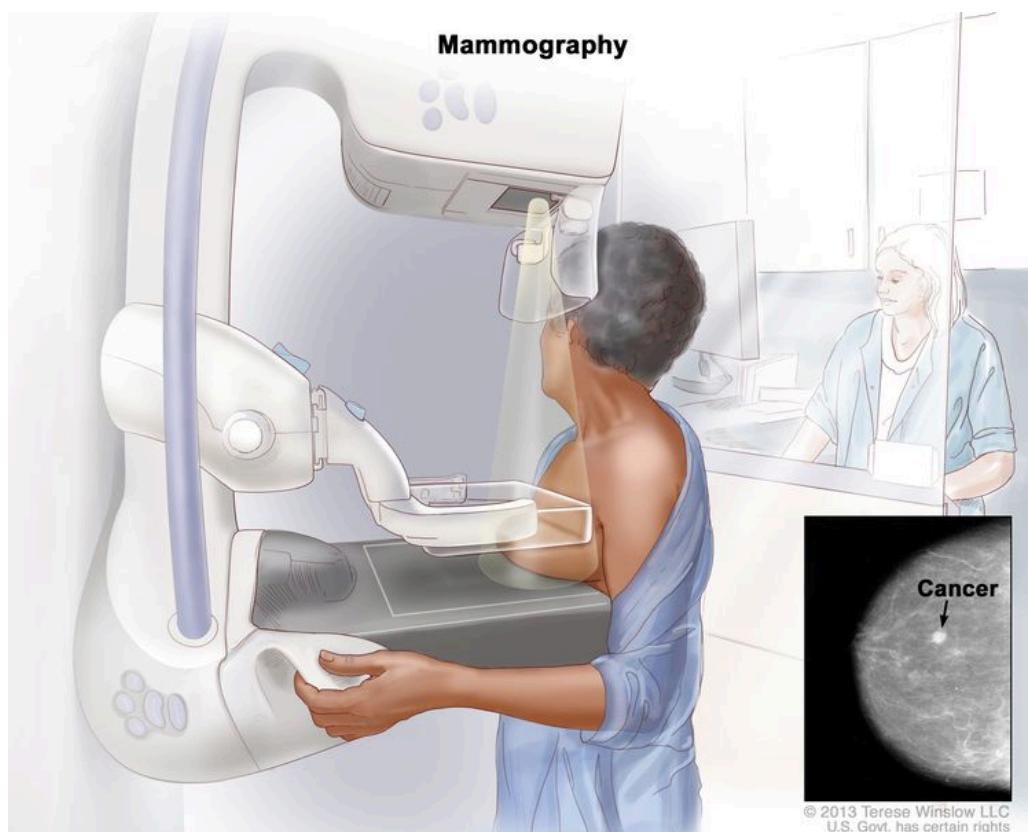
A mammogram is a picture of the inside of the breast. Mammography may find tumors that are too small to feel. It may also find ductal carcinoma in situ (DCIS). In DCIS, abnormal cells line the breast duct, and in some women may become invasive cancer.

There are different types of mammograms:

- Film mammography is an x-ray picture of the breast.
- Digital mammography (DM) is a computer picture of the breast.
- Digital breast tomosynthesis (DBT) uses x-rays to take a series of pictures of the breast from many different angles. A computer is used to make 3-D pictures of the breast from these x-rays.
- 2-dimensional mammography (S2D) uses x-rays to take pictures of the inside of the breast, usually from two different angles. A computer or x-ray film is used to make 2-D pictures of the breast.

Digital breast tomosynthesis (DBT) was approved by the U.S. Food and Drug Administration (FDA) in 2018 and is now used in 3 out of 4 facilities. One recent study found that 2-dimensional mammography (S2D) combined with DBT improved tumor detection rates and lowered mammogram callbacks, radiation dose, and overall costs. More studies are being done to compare different types of breast cancer screening.

Mammography is less likely to find breast tumors in women with dense breast tissue. Because both tumors and dense breast tissue appear white on a mammogram, it can be harder to find a tumor when there is dense breast tissue. Younger women are more likely to have dense breast tissue. For more information, see [Dense Breasts: Answers to Commonly Asked Questions](#).



Mammography. The breast is pressed between two plates. X-rays are used to take pictures of breast tissue.

Many factors affect whether mammography is able to detect (find) breast cancer:

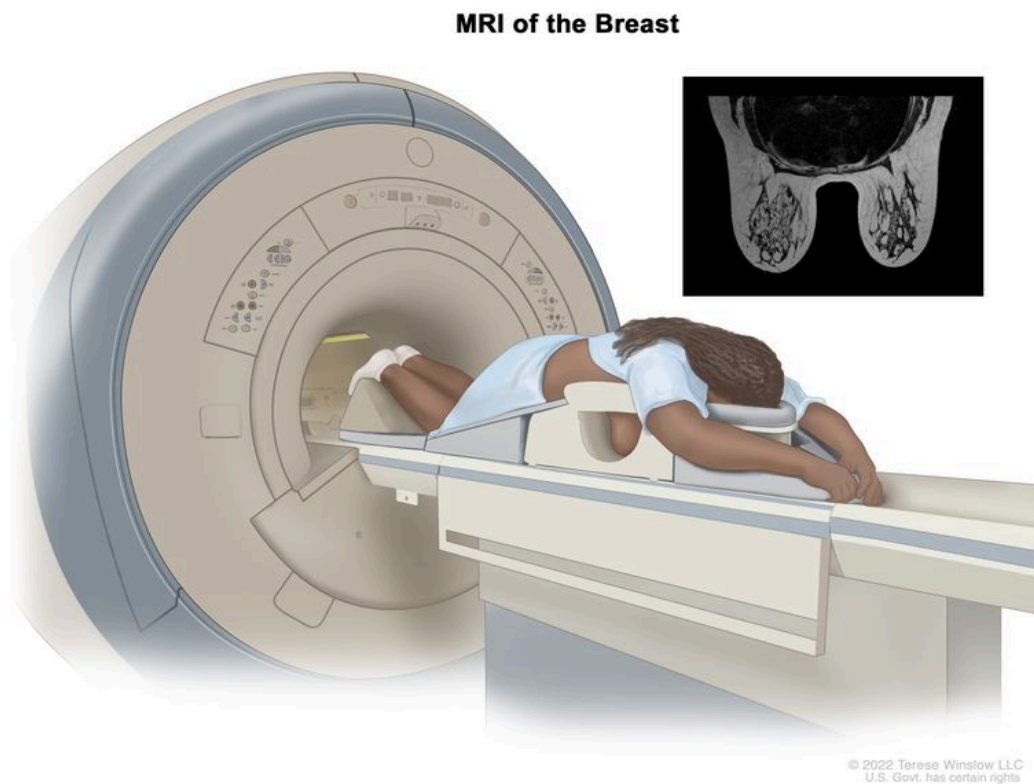
- The age and weight of the patient.
- The size and type of tumor.
- Where the tumor has formed in the breast.
- How sensitive the breast tissue is to hormones.
- How dense the breast tissue is.
- The timing of the mammography within the woman's menstrual cycle.
- The quality of the mammogram picture.
- The skill of the radiologist in reading the mammogram.

Women aged 50 to 69 years who have screening mammograms have a lower chance of dying from breast cancer than women who do not have screening mammograms.

Fewer women are dying of breast cancer in the United States, but it is not known whether the lower risk of dying is because the cancer was found early by screening or whether the treatments were better.

Magnetic resonance imaging (MRI) may be used to screen women who have a high risk of breast cancer.

MRI is a procedure that uses a magnet, radio waves, and a computer to make a series of detailed pictures of areas inside the body. This procedure is also called nuclear magnetic resonance imaging (NMRI). MRI does not use any x-rays and the woman is not exposed to radiation.



An MRI of the breast is a procedure that uses radio waves, a strong magnet, and a computer to create detailed pictures of the inside of the breast. A contrast dye may be injected into a vein (not shown) to make the breast tissues easier to see on the MRI pictures. An MRI may be used with other breast imaging tests to detect breast cancer or other abnormal changes in the breast. It may also be used to screen for breast cancer in some people who have a high risk of the disease.

Note: The inset shows an MRI image of the insides of both breasts.

Credit for inset: The Cancer Imaging Archive (TCIA).

MRI may be used as a screening test for women who have a high risk of breast cancer. Factors that put women at high risk include the following:

- Certain gene changes, such as changes in the *BRCA1* or *BRCA2* genes.
- A family history (first degree relative, such as a mother, daughter or sister) with breast cancer.
- Certain genetic syndromes, such as Li-Fraumeni or Cowden syndrome.

An MRI is more likely than mammography to find a breast mass that is not cancer.

Women with dense breasts who have supplemental screening (for example, an MRI) show higher rates of breast cancer detection, but there is limited evidence about whether this leads to better health outcomes.

Whether a woman should be screened for breast cancer and the screening test to use depends on certain factors.

Women with risk factors for breast cancer, such as certain changes in the *BRCA1* or *BRCA2* gene or certain genetic syndromes may be screened at a younger age and more often.

Women who have had radiation treatment to the chest, especially at a young age, may start routine breast cancer screening at an earlier age. The benefits and risks of mammograms and MRIs for these women have not been studied.

Breast cancer screening has not been shown to benefit the following women:

- Elderly women who, if diagnosed with breast cancer through screening, will usually die of other causes. Screening mammograms for those aged 66 to 79 years may find cancer in a very small percentage of women, but most of these cancers are low risk.
- In women with an average risk of developing breast cancer, screening mammography before age 40 has not shown any benefit.
- In women who are not expected to live for a long time and have other diseases or conditions, finding and treating early stage breast cancer may reduce their quality of life without helping them live longer.

Other screening tests have been or are being studied in clinical trials.

Studies have been done to find out if the following breast cancer screening tests are useful in finding breast cancer or helping women with breast cancer live longer.

Breast Exam

A clinical breast exam is an exam of the breast by a doctor or other health professional. He or she will carefully feel the breasts and under the arms for lumps or anything else that seems unusual. It is not known if having clinical breast exams decreases the chance of dying from breast cancer.

Breast self-exams may be done by women or men to check their breasts for lumps or other changes. If you feel any lumps or notice any other changes in your breasts, talk to your doctor. Doing regular breast self-exams has not been shown to decrease the chance of dying from breast cancer.

Thermography

Thermography is a procedure in which a special camera that senses heat is used to record the temperature of the skin that covers the breasts. Tumors can cause temperature changes that may show up on the thermogram.

There have been no randomized clinical trials of thermography to find out how well it detects breast cancer or the harms of the procedure.

Tissue sampling

Breast tissue sampling is taking cells from breast tissue to check under a microscope. Breast tissue sampling as a screening test has not been shown to decrease the risk of dying from breast cancer.

Screening tests for breast cancer are being studied in clinical trials.

Information about clinical trials supported by NCI can be found on NCI's [clinical trials search](#) webpage. Clinical trials supported by other organizations can be found on the [ClinicalTrials.gov](#) website.

Harms of Breast Cancer Screening

KEY POINTS

- Screening tests can have harms.
- The harms of mammography include the following:
 - False-positive test results can occur.
 - False-positive results can lead to extra testing and cause anxiety.
 - False-negative test results can delay diagnosis and treatment.
 - Finding breast cancer may lead to breast cancer treatment and side effects, but it may not improve a woman's health or help her live longer.
 - Mammography exposes the breast to low doses of radiation.
 - There may be pain or x-ray discomfort during a mammogram.
- Talk to your doctor about your risk of breast cancer and your need for screening tests.

Screening tests can have harms.

Not all breast cancers will cause death or illness in a woman's lifetime, so they may not need to be found or treated.

Decisions about screening tests can be difficult. Not all screening tests are helpful and most have harms. Before having any screening test, you may want to discuss the test with your

doctor. It is important to know the harms of the test and whether it has been proven to reduce the risk of dying from cancer.

The harms of mammography include the following:

False-positive test results can occur.

Screening test results may appear to be abnormal even though no cancer is present. A false-positive test result (one that shows there is cancer when there really isn't) is usually followed by more tests (such as biopsy), which also have risks.

When a breast biopsy result is abnormal, getting a second opinion from a different pathologist may confirm a correct breast cancer diagnosis.

Most abnormal test results turn out not to be cancer. False-positive results are more common in the following:

- Younger women (under age 50).
- Women who have had previous breast biopsies.
- Women with a family history of breast cancer.
- Women who take hormones for menopause.

False-positive results are more likely the first time screening mammography is done than with later screenings. For every ten women who have a single mammogram, one will have a false-positive result. The chance of having a false-positive result goes up the more mammograms a woman has. Comparing a current mammogram with a past mammogram lowers the risk of a false-positive result.

The skill of the radiologist also can affect the chance of a false-positive result.

False-positive results can lead to extra testing and cause anxiety.

If a mammogram is abnormal, more tests may be done to diagnose cancer. Women can become anxious during the diagnostic testing. Even if it is a false-positive test and cancer is not diagnosed, the result can lead to anxiety anywhere from a few days to years later.

Several studies show that women who feel anxiety after false-positive test results are more likely to schedule regular breast screening exams in the future.

False-negative test results can delay diagnosis and treatment.

Screening test results may appear to be normal even though breast cancer is present. This is called a false-negative test result. A woman who has a false-negative test result may delay seeking medical care even if she has symptoms. About one in 5 cancers are missed by mammography.

The chance of a false-negative test result is more common in women who:

- Are younger.
- Have dense breast tissue.
- Have cancer that is not dependent on hormones (estrogen and progesterone).
- Have cancer that is fast growing.

Finding breast cancer may lead to breast cancer treatment and side effects, but it may not improve a woman's health or help her live longer.

Some breast cancers found only by screening mammography may never cause health problems or become life-threatening. Finding these cancers is called overdiagnosis. When these cancers are found, having treatment may cause serious side effects and may not lead to a longer, healthier life.

Mammography exposes the breast to low doses of radiation.

Being exposed to high radiation doses is a risk factor for breast cancer. The radiation dose with a mammogram is very low. Women who start getting mammograms after age 50 have very little risk that the overall exposure to radiation from mammograms throughout their lives will cause harm. Women with large breasts or with breast implants may be exposed to slightly higher radiation doses during screening mammography.

There may be pain or x-ray discomfort during a mammogram.

During a mammogram, the breast is placed between two plates that are pressed together. Pressing the breast helps to get a better of the breast. Some women have pain or discomfort during a mammogram. The amount of pain may also depend on the following:

- The phase of the woman's menstrual cycle.
- The woman's anxiety level.
- How much pain the woman expected.

Talk to your doctor about your risk of breast cancer and your need for screening tests.

Talk to your doctor or other care provider about your risk of breast cancer, whether a screening test is right for you, and the benefits and harms of the screening test. You should take part in the decision about whether you want to have a screening test, based on what is best for you. For more information, see [Cancer Screening Overview](#).

About This PDQ Summary