

Cancer_{Net}[™]

Making a world of difference in cancer care

Guide to Breast Cancer



*Comprehensive, oncologist-approved cancer information from the
American Society of Clinical Oncology (ASCO)*

www.cancer.net

Made available through:

ASCO
Cancer Foundation[™]

ABOUT ASCO

The American Society of Clinical Oncology (ASCO) is the world's leading professional organization representing physicians of all oncology subspecialties who care for people with cancer.

ABOUT THE CANCER.NET GUIDES TO CANCER

The Cancer.Net Guides to Cancer provide patients with comprehensive, peer-reviewed information based on content from Cancer.Net (www.cancer.net), ASCO's patient information website.

Good cancer care starts with good cancer information. Well-informed patients are their own best advocates, and invaluable partners for physicians. The ASCO Cancer Foundation supports oncologists and patients by providing unquestionably accurate, physician-approved cancer information. This content is available publicly both in print and online, to provide trusted, authoritative information for people living with cancer and those who care for and care about them. People in search of cancer information can feel secure knowing that the programs supported by The ASCO Cancer Foundation provide the most thorough, accurate, and up-to-date cancer information you'll find anywhere.

TABLE OF CONTENTS

Overview	2
Statistics	3
Risk Factors	4
Prevention	6
Symptoms	8
Diagnosis	8
Imaging tests	9
Surgical tests	9
Blood tests	10
Additional tests	11
Staging	12
Cancer stage grouping	14
Treatment	18
Surgery	19
Radiation therapy	20
Chemotherapy	23
Hormone therapy	24
Targeted therapy	25
Recurrent and metastatic breast cancer	26
Clinical Trials Resources	27
Side Effects	28
After Treatment	29
Current Research	30
Questions to Ask the Doctor	30
Patient Information Resources	31

Advances in the diagnosis, treatment, and prevention of cancer occur regularly. For more information, visit Cancer.Net (www.cancer.net).

Information in ASCO's patient information materials is not intended as medical advice or as a substitute for the treating doctor's own professional judgment; nor does it imply ASCO endorsement of any product, service, or company.

OVERVIEW

In the United States, breast cancer is the most common cancer occurring in women (excluding cancers of the skin) and the second most common cause of death from cancer in women, after lung cancer. Men can also develop breast cancer, but male breast cancer is rare, accounting for less than 1% of all breast cancer cases. For more information on male breast cancer, visit www.cancer.net/malebreast.

The breast is mainly composed of fatty tissue. Within this tissue is a network of lobes, which are made up of tiny, tube-like structures called lobules that contain milk glands. Tiny ducts connect the glands, lobules, and lobes, carrying the milk from the lobes to the nipple, located in the middle of the areola (darker area that surrounds the nipple of the breast). Blood and lymph vessels run throughout the breast; blood nourishes the cells, and the lymph system drains bodily waste products. The lymph vessels connect to lymph nodes, which are tiny, bean-shaped organs that normally help fight infection.

About 90% of all breast cancer cases start in the ducts or lobes. Almost 75% of all breast cancers begin in the cells lining the milk ducts and are called ductal carcinomas. Cancer that begins in the lobules is called lobular carcinoma. If the disease has spread outside of the duct and into the surrounding tissue, it is called invasive or infiltrating ductal carcinoma. If the disease has spread outside of the lobule, it is called invasive or infiltrating lobular carcinoma. Disease that has not spread is called in situ, meaning “in place.” The course of in situ disease, as well as its treatment, depends on whether it is ductal carcinoma in situ (DCIS) or lobular carcinoma in situ (LCIS).

Currently, oncologists recommend that DCIS, which accounts for the majority of in situ breast cancers, be surgically removed to help prevent the cancer from changing into an invasive breast cancer and potentially spreading to other parts of the breast or the body. In addition to surgery, radiation therapy and hormone therapy may be recommended for DCIS.

LCIS is not considered cancer and is usually monitored by the doctor. LCIS is a risk factor for breast cancer (see the Risk Factors section).

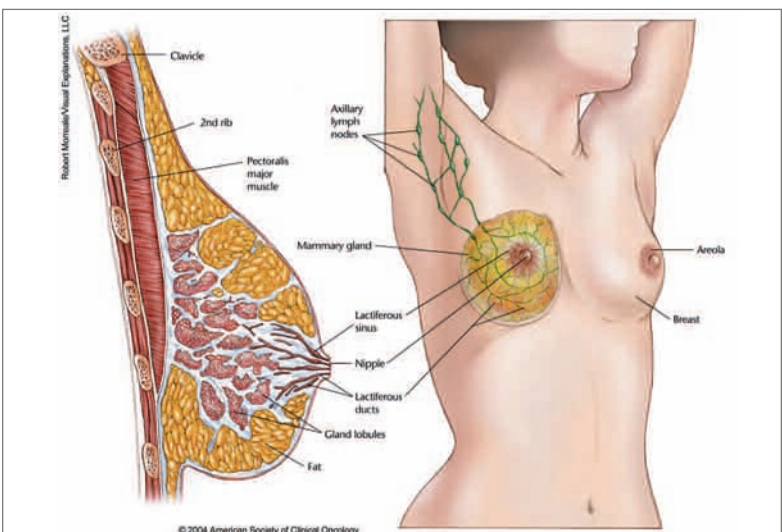
Other, less common cancers of the breast include medullary, mucinous, tubular, metaplastic, and papillary breast cancer. Inflammatory breast cancer is a faster-growing type of cancer that accounts for about 1% to 5% of all breast cancers. It may be misdiagnosed as a breast infection because there is often swelling of the breast and redness of the breast skin. Paget's disease is a type of in situ cancer that can begin in the ducts of the nipple. The skin often appears scaly and may be itchy.

Cancer may begin as a single, genetically abnormal cell. As this one cell divides, it eventually becomes a tumor (a mass of cells) and

develops a blood supply to nourish its continued growth. At some point, cells may break off from the primary mass and move to other parts of the body in a process called metastasis.

Breast cancer spreads when breast cancer cells move to other sites in the body through the blood vessels and/or lymph vessels. A common site of spread is the regional lymph nodes. The lymph nodes can be axillary (located under the arm), cervical (located in the neck), or supraclavicular (located just above the collarbone). The most common sites of distant metastasis are the bones, lungs, and liver. Less commonly, breast cancer may spread to the brain. The cancer can also recur (come back after treatment) locally in the skin, in the same breast (if it was not removed as part of treatment), other tissues of the chest, or elsewhere in the body.

Most of the time, breast cancer is diagnosed and treated before metastasis occurs. According to the latest data from the National Cancer Institute (NCI), 61% of breast cancers are diagnosed while the cancer is still in the breast, 31% are diagnosed after the cancer has spread to nearby lymph nodes or just outside the breast, and 6% are diagnosed once the cancer has metastasized beyond the adjoining lymph nodes.



Anatomical and staging illustrations for many types of cancer are available at www.cancer.net.

Statistics

In 2008, an estimated 182,460 women in the United States will be diagnosed with invasive breast cancer, and 67,770 women will be diagnosed with in situ breast cancer. An estimated 1,990 men in the United States will be diagnosed with breast cancer. It is estimated that 40,930 deaths (40,480 women, 450 men) from this disease will occur this year.

If the cancer is limited to the breast, the five-year relative survival rate (percentage of patients who survive at least five years after the cancer is detected, excluding those who die from other diseases) is

RISK FACTORS

98%. If the cancer has spread to the regional lymph nodes, the five-year relative survival rate is 84%. If the cancer has spread to a distant site, the five-year relative survival rate is 27%. Even if the cancer is found at a more advanced stage, new therapies enable many people with breast cancer to experience the same quality of life as before their diagnosis.

It is important to note that these statistics are averages, and each individual's risk depends upon numerous factors, including the size of the tumor and the number of positive lymph nodes (lymph nodes that contain cancer). The survival rate is higher and the chance of recurrence is lower for a smaller tumor with negative lymph nodes (lymph nodes that do not contain cancer). The recurrence rate increases with an increase in tumor size and number of positive lymph nodes.

Since 1990, the number of women who have died of breast cancer has declined steadily each year. In women younger than 50, there has been a decrease of 3.3% per year; in women age 50 and older, the decrease has been 2% per year. Currently, there are about two and a half million women living in the United States who have been diagnosed with and treated for breast cancer.

Cancer survival statistics should be interpreted with caution. These estimates are based on data from thousands of cases of this type of cancer in the United States each year, but the actual risk for a particular individual may differ. It is not possible to tell a person how long he or she will live with breast cancer. Because the survival statistics are measured in five-year (or sometimes one-year) intervals, they may not represent advances made in the treatment or diagnosis of this cancer.

Statistics adapted from the American Cancer Society's publication, *Cancer Facts & Figures 2008*.

To learn about the cancer terms used in this section, read the Cancer.Net Feature: Cancer Terms to Know: Basic Oncology Terms at www.cancer.net/features.

RISK FACTORS

A risk factor is anything that increases a person's chance of developing cancer. Some risk factors can be controlled, such as smoking, and some cannot be controlled, such as age and family history. Although risk factors can influence the development of cancer, most do not directly cause cancer. Some people with several risk factors never develop cancer, while others with no known risk factors do. However, knowing your risk factors and communicating them to your doctor may help you make more informed lifestyle and health-care choices.

Many cases of breast cancer occur in women with no obvious risk factors. This means that all women need to be aware of possible

changes in their breasts and schedule a clinical breast examination and mammogram (x-ray of the breast that can detect a tumor that is too small to be felt). It is likely that multiple risk factors influence the development of breast cancer. The following factors may raise a woman's risk of developing breast cancer:

Age. The risk of developing breast cancer increases as a woman ages, with most cases developing in women over 50.

Race. Although white women are more likely to develop breast cancer, black women are more likely to die from the disease. Reasons for survival differences are unclear and probably involve both socioeconomic and biologic factors.

Personal history of breast cancer. A woman who has had breast cancer in one breast has a 1% to 2% increased risk per year for developing breast cancer in her opposite breast.

Family history of breast cancer. Women who have a first-degree relative (mother, sister, daughter) diagnosed with breast cancer are at increased risk for the disease. More than one first-degree relative with breast cancer elevates that risk, especially if the cancer occurred before menopause. Women who have a second-degree relative (aunt, niece, grandmother, granddaughter) diagnosed with breast cancer also have a higher risk of breast cancer.

Genetic predisposition. Mutations to the breast cancer genes 1 or 2 (*BRCA1* or *BRCA2*) are associated with increased breast cancer risk. Blood tests are available to test for known mutations to these genes, but are not recommended for everyone and **only after** a person has received appropriate genetic counseling. Researchers estimate that breast cancers with genetic causes make up only 5% to 10% of all breast cancers. To learn more about the genetics of breast cancer, visit www.cancer.net/genetics.

Personal history of ovarian cancer. Because ovarian cancer is also associated with exposure to hormones, a history of ovarian cancer can increase a woman's risk of breast cancer. Some breast cancer gene mutations, such as *BRCA1* and *BRCA2*, may increase the risk of both ovarian and breast cancers.

Estrogen exposure. Estrogen is a hormone in women that controls the development of secondary sex characteristics (such as breast development). A woman's production of estrogen decreases at menopause. Doctors think that exposure to estrogen for a long time may increase breast cancer risk.

- Women who began menstruating before age 12 or went through menopause after age 55 have a higher risk of breast cancer because their breast cells have been exposed to estrogen for a longer time.
- Women who have their first pregnancy after age 30 or who have never had a full-term pregnancy have a higher risk of breast

PREVENTION

cancer. Pregnancy may protect against breast cancer, because it pushes breast cells into their final phase of maturation.

- Recent use (within the past five years) of hormone replacement therapy (HRT) and long-term use (several years or more) of HRT increases a woman's risk of breast cancer.

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

LCIS. As explained in the Overview section, this condition describes abnormal cells found in the lobules or glands of the breast. LCIS increases the risk of developing invasive breast cancer (cancer that spreads into surrounding tissues). Talk with your doctor about the best way to monitor this condition.

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

- Obesity. Recent studies have shown that being obese or even overweight increases a woman's risk of breast cancer.
- Lack of exercise. Exercise lowers hormone levels and boosts the immune system; lack of exercise contributes to obesity.
- Alcohol use. Drinking more than one alcoholic drink per day may raise the risk of breast cancer.

Radiation. High doses of radiation may increase a woman's risk of breast cancer. An increased risk of breast cancer has been observed in long-term survivors of atomic bombs, people with lymphoma treated with radiation therapy to the chest, people undergoing large numbers of x-rays (such as for tuberculosis or to treat residual thymic disease or acne), nonmalignant (noncancerous) conditions of the spine, and children treated with radiation therapy for ringworm.

PREVENTION

Currently, there are no proven means to prevent breast cancer, although there are ways to reduce the risk of breast cancer in some women.

- For women with especially strong family histories of breast cancer (such as *BRCA* mutations), a prophylactic mastectomy (preventive removal of the breasts) may be considered. This appears to reduce the risk of developing breast cancer by at least 95%.
- Women who are at higher than normal risk for developing breast cancer may consider chemoprevention (the use of drugs to reduce breast cancer risk). One such drug is tamoxifen (Nolvadex), which is a selective estrogen receptor modulator (SERM). A SERM is a medication that blocks estrogen receptors in some tissues and not others. Tamoxifen can reduce a woman's risk of developing breast cancer and the risk of the cancer recurring once a woman has been treated for breast cancer. Like

estrogen, tamoxifen helps increase bone density in postmenopausal women and protects the cardiovascular system. Unlike estrogen, SERMs do not promote the development of breast cells into cancer cells; however, they may increase the risk of blood clots and uterine (endometrial) cancer.

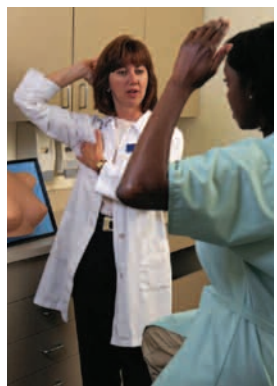
For most women, regular mammography and clinical breast examinations (examinations by a doctor or other health-care professional) can help find early signs of breast cancer. In addition, women should become familiar with their own breasts. Checking your own breasts for lumps with breast self-examination may help if performed correctly. Talk with your doctor for more information.

The STAR trial

The Study of Tamoxifen and Raloxifene (STAR) trial, launched in May 1999, is a breast cancer risk reduction clinical trial. A clinical trial is a research study involving people. The STAR trial compared tamoxifen and raloxifene (Evista) in reducing the risk of breast cancer in postmenopausal women over age 35 who have an increased risk of developing breast cancer. The clinical trial was conducted by the NCI and the National Surgical Adjuvant Breast and Bowel Project (NSABP). A recent analysis of the clinical trial data shows that both tamoxifen and raloxifene reduce the risk of invasive breast cancer by about 50% in women at high risk for the disease (this is the relative risk; the absolute risk for any woman taking these medications to lower the risk of breast cancer is 2% to 3%). Raloxifene does not lower the risk of noninvasive breast cancer. Neither drug significantly impairs quality of life. Because these drugs are associated with different side effects, women should discuss the risks and benefits of each drug with their doctors.

Screening guidelines

The U.S. Preventive Services Task Force (USPSTF) recommends that women 40 to 75 years old undergo mammography every one to two years, and the American Cancer Society (ACS) recommends yearly mammography. Mammography is the best tool doctors have to screen for breast cancer and can detect a tumor that is too small to be felt. All women should talk with their doctors about mammography and decide on an appropriate screening schedule.



Occasionally, mammograms may miss a cancer. Other methods of breast imaging, such as ultrasound and magnetic resonance imaging (MRI), are not regularly used for screening purposes. However, they may be helpful for evaluating women at a higher risk for breast cancer, including women with a *BRCA* mutation and women who received radiation therapy for Hodgkin lymphoma. These other screening methods may also be used for those with a suspicious finding on physical examination. If there are suspicious

findings on physical examination, further evaluation is necessary, even if the mammogram is interpreted as normal.



The USPSTF and ACS differ on their recommendations for clinical breast examination. The USPSTF recommends a clinical breast examination along with mammography, and the ACS recommends a clinical breast examination every one to three years. Breast self-examination has

not been shown to lower deaths from breast cancer, but it is important for women to become familiar with their breasts so that they can be aware of any changes. Women are encouraged to discuss the frequency of screening with their doctors.

SYMPTOMS

Women with breast cancer may experience the following symptoms. Sometimes, women with breast cancer do not show any of these symptoms. Or, these symptoms may be caused by a medical condition that is not cancer. If you are concerned about a symptom on this list, please talk with your doctor.

However, most women who develop breast cancer have no signs or symptoms. The signs and symptoms to look for include:

- New lumps (many women normally have lumpy breasts) or a thickening in the breast or under the arm
- Nipple tenderness, discharge, or physical changes (such as a nipple turned inward or a persistent sore)
- Skin irritation or changes, such as puckers, dimples, scaliness, or new creases
- Warm, red, swollen breasts with a rash resembling the skin of an orange (called *peau d'orange*)
- Pain in the breast (usually not a symptom of breast cancer, but should be reported to a doctor)

DIAGNOSIS

Doctors use many tests to diagnose cancer and determine if it has metastasized. Some tests may also find out which treatments may be the most effective. For most types of cancer, a biopsy (the removal of a small amount of tissue for examination under a microscope) is the only way to make a definitive diagnosis of cancer. If a biopsy is not possible, the doctor may suggest other tests that will help make a diagnosis. Imaging tests may be used to find out whether the cancer has metastasized. Your doctor may consider these factors when choosing a diagnostic test:

- Age and medical condition
- The type of cancer suspected
- Severity of symptoms
- Previous test results

The diagnosis of breast cancer usually begins when a woman or doctor discovers a mass or abnormal calcification (tiny spot of calcium usually found on an x-ray) on a screening mammogram, or an abnormality in the woman's breast by clinical examination or self-examination. Several tests may be done to confirm a diagnosis of breast cancer. Not every person will have all of these tests.

In addition to screening mammography, the following tests may be used to diagnose breast cancer:

Imaging tests

Diagnostic mammography. Diagnostic mammography is similar to screening mammography except that more views (pictures) of the breast are taken, and it is often used when a woman is experiencing signs, such as nipple discharge or a new lump. Diagnostic mammography may also be used if something suspicious is found on a screening mammogram.

Ultrasound. An ultrasound uses high-frequency sound waves to create an image of the breast tissue. An ultrasound may distinguish between a solid mass, which may be cancer, and a fluid-filled cyst, which is usually not cancer.

MRI. An MRI uses magnetic fields, not x-rays, to produce detailed images of the body. A contrast medium (a special dye) may be injected into a patient's vein to create a clearer picture. An MRI may be used once a woman has been diagnosed with cancer to check the other breast for cancer, but the benefit of this is controversial. It may also be used for screening. According to the ACS, women at high risk for breast cancer (for example, women with *BRCA* gene mutations or a strong family history of breast cancer) should receive MRI screening along with a mammogram. MRI may often be better at seeing a small mass within a woman's breast than a mammogram or ultrasound, especially for women with very dense breast tissue, but has a higher rate of false-positive test results (a test result that indicates cancer when there is no cancer present) and may result in more biopsies. In addition, an MRI does not show calcifications, which could indicate in situ breast cancer. Talk with your doctor for more information.

Surgical tests

Biopsy. A biopsy is the removal of a small amount of tissue for examination under a microscope. Other tests can suggest that cancer is present, but only a biopsy can make a definite diagnosis. The sample removed from the biopsy is analyzed by a pathologist (a doctor who specializes in interpreting laboratory tests and evaluating cells, tissues, and organs to diagnose disease).

- Image guided biopsy is used when a distinct lump can't be felt.

It can be done with a fine needle aspiration biopsy (FNAB, uses a small needle to remove the tissue sample), stereotactic core biopsy (uses x-rays to find the area of tissue to be removed), or a vacuum-assisted biopsy (uses a thicker needle to remove multiple large cores of tissue). During this procedure, a needle is guided to the area of concern with the help of mammography, ultrasound, or MRI. A small metal clip may be put into the breast to mark the site of biopsy, in case the sample tissue proves cancerous and additional surgery is required. An advantage of this technique is that a patient may only need one operation for treatment or staging.

- Core biopsy can obtain tissue or FNAB can obtain cells in masses that can be felt, and these can then be analyzed for the presence of malignant (cancerous) cells.
- Surgical biopsy removes the largest amount of tissue. This biopsy may be incisional (removal of part of the lump) or excisional (removal of the entire lump).

If cancer is diagnosed, a second surgery may be needed to get a clear margin (area of tissue around the tumor where there are no cancer cells) and/or remove lymph nodes.

Doctors may also test the tissue from a biopsy to help guide treatment decisions. The tests include:

- Tumor features. Examination of the tumor under the microscope determines if it is invasive or in situ; ductal or lobular; grade (how different the cancer cells look from healthy cells); and whether the cancer has spread to the blood vessels or lymph vessels. The margins of the tumor are also examined.
- Estrogen receptor (ER) and progesterone receptor (PR) tests. Breast cancer cells with these receptors depend on the hormones estrogen and progesterone to grow. The presence of these receptors helps determine both the patient's prognosis (chance of recovery) and whether the cells are likely to respond to hormone therapy. Generally, ER-positive or PR-positive tumors respond to hormone therapy.
- HER2 tests. There is too much of the protein HER2 in about 25% of breast cancers. The HER2 status helps determine whether a drug, such as trastuzumab (Herceptin), might be useful for treating breast cancer. Read more in the ASCO Patient Guide: HER2 Testing for Breast Cancer at www.cancer.net/patientguides.
- Genetic description of the tumor. Tests that look at the biology of the tumor are becoming more common to understand more about a woman's breast cancer. Oncotype Dx is a type of test that measures the risk of distant recurrence (return of the cancer in a place other than the breast) at 10 years for women with stage I or stage II node-negative, ER-positive breast cancer that may be treated with hormone therapy. This information may also be used to plan treatment. Talk with your doctor for more information.

Blood tests

The doctor may also need to do blood tests to learn more about the cancer.

Complete blood count (CBC). CBC is a blood test done to determine the following:

- Hemoglobin level (a measure of the number of oxygen-carrying cells)
- Hematocrit level (the percentage of red blood cells in whole blood)
- The number of white blood cells (cells that help to fight infection)
- The number of platelets (cells that help blood to clot as necessary)
- Differential (the percentage of several types of white blood cells)

Alkaline phosphatase levels. High levels of this enzyme could indicate the disease has spread to the liver, bone, or bile ducts.

Tumor markers. Carcinoembryonic antigen (CEA), cancer antigen (CA) 15-3, or CA 27.29 may indicate the presence or degree of cancer; however, these tests are not usually helpful for guiding treatment decisions.

Total bilirubin count, serum glutamic-oxaloacetic transaminase (SGOT), and serum glutamate pyruvate transaminase (SGPT) levels. These tests evaluate liver function. High levels of any of these substances can indicate liver damage, a signal of possible spread to that organ.

Tumor marker tests. A tumor marker (also called a serum marker or biomarker) is a substance found in a person's blood, urine, or body tissue. The presence of a tumor marker, or having higher or lower than normal levels of a tumor marker, may indicate an abnormal process in the body, which could be because of cancer or a noncancerous condition. Tumor markers may be used for diagnosis, treatment planning, and/or treatment monitoring. For more information, read the ASCO Patient Guide: Tumor Markers for Breast Cancer at www.cancer.net/patientguides.

Additional tests

The doctor may order additional tests (depending on the individual's medical history and results of the physical examination) to evaluate the stage of the cancer. Read the Staging section for more information. These tests are not recommended for all patients.

- A chest x-ray may be used to look for cancer that has spread from the breast to the lung.
- A bone scan may be used to look for spread to the bones. A bone scan uses a radioactive tracer to look at the inside of the bones. The tracer is injected into a patient's vein. It collects in areas of the bone and is detected by a special camera. Healthy bone appears gray to the camera, and areas of injury, such as those caused by cancer, appear dark.
- A computed tomography (CT or CAT) scan may be used to look for distant tumors. A CT scan creates a three-dimensional picture of the inside of the body with an x-ray machine. A computer combines these images into a detailed, cross-sectional view that shows any abnormalities or tumors. Sometimes, a contrast medium is injected into a patient's vein to provide better detail.
- A positron emission tomography (PET) scan may be used to

determine whether the cancer has spread. A PET scan is a way to create pictures of organs and tissues inside the body. A small amount of a radioactive substance is injected into a patient's body and absorbed by the organs or tissues being studied. This substance gives off energy that is detected by a scanner, which produces the images.

To learn more about what to expect during common diagnostic tests, read Cancer.Net: Tests and Procedures at www.cancer.net/features.

To learn about the terms used in this section, read the Cancer.Net Feature: Cancer Terms to Know: Newly Diagnosed at www.cancer.net/features.

STAGING

Staging is a way of describing a cancer, such as where it is located, if or where it has spread, and if it is affecting the functions of other organs in the body. Doctors use diagnostic tests to determine the cancer's stage, so staging may not be complete until all the tests are finished. Knowing the stage helps the doctor to decide what kind of treatment is best and can help predict a patient's prognosis. There are different stage descriptions for different types of cancer.

One tool that doctors use to describe the stage is the TNM system. This system uses three criteria to judge the stage of the cancer: the tumor itself, the lymph nodes around the tumor, and if the tumor has spread to other parts of the body. The results are combined to determine the stage of cancer for each person. There are five stages: stage 0 (zero) and stages I through IV (one through four). The stage provides a common way of describing the cancer so doctors can work together to plan the best treatments.

TNM is an abbreviation for tumor (T), node (N), and metastasis (M). Doctors look at these three factors to determine the stage of cancer:

- How large is the primary tumor and where is it located?
(Tumor, T)
- Has the tumor spread to the lymph nodes? **(Node, N)**
- Has the cancer metastasized to other parts of the body?
(Metastasis, M)

Tumor. Using the TNM system, the “T” plus a letter or number (0 to 4) is used to describe the size and location of the tumor. Some stages are divided into smaller groups that help describe the tumor in even more detail.

TX: The primary tumor cannot be evaluated.

T0: There is no evidence of cancer in the breast.

Tis: Refers to carcinoma (cancer) in situ. In this case, the cancer is confined within the natural boundaries of the breast tissue and has not spread into the surrounding tissue of the breast. There are

three types of breast carcinoma in situ:

- **Tis (DCIS):** DCIS is a precancer, but it can later develop into an invasive type of breast cancer. A designation of DCIS means that only a few cancer cells have been found in breast ducts and have not spread past the layer of tissue where they began.
- **Tis (LCIS):** LCIS describes abnormal cells found in the lobules or glands of the breast. LCIS is not cancer, but it increases the risk of developing invasive breast cancer.
- **Tis (Paget's):** Paget's disease of the nipple is a rare form of early breast cancer. This designation is used only if there is Paget's disease but no tumor present. If there is a tumor, it is classified according to the size of the tumor.

T1: A tumor in the breast is 2 centimeters (cm) or smaller in size at its widest dimension.

T1mic: Microinvasion, or micrometastases, means a few cancer cells have spread to surrounding tissue, but none larger than 0.1 cm.

T1a: The tumor is larger than 0.1 cm but smaller than 0.5 cm.

T1b: The tumor is larger than 0.5 cm but smaller than 1 cm.

T1c: The tumor is larger than 1 cm but not larger than 2 cm.

T2: The tumor is larger than 2 cm but not larger than 5 cm.

T3: The tumor is larger than 5 cm.

T4: The tumor has spread to the chest wall or to the skin or is diagnosed as inflammatory breast cancer.

T4a: The tumor has spread into the chest wall.

T4b: There is edema (swelling), thickening of the skin (as in peau d'orange), or ulceration (a sore, painful area where the breast skin/tissue is breaking down) of the breast skin or surrounding skin of the same breast.

T4c: There are signs of both T4a and T4b.

T4d: Refers to inflammatory carcinoma. This is an aggressive type of breast cancer where the breast is red, swollen, and warm.

Node. The "N" in the TNM staging system stands for lymph nodes, the tiny, bean-shaped organs that help fight infection. Lymph nodes located under the arm, above and below the collarbone, and under the breastbone are called regional lymph nodes. Lymph nodes in other parts of the body are called distant lymph nodes.

NX: The lymph nodes cannot be evaluated.

N0: No cancer was found in the lymph nodes.

N1: The cancer has spread to one to three axillary lymph nodes.

N2: The cancer has spread to four to nine lymph nodes under the arm or to the internal mammary lymph nodes (lymph nodes to the right or left of the sternum [breastbone] on the inside of the chest) without axillary node involvement.

N2a: The cancer has spread to four to nine lymph nodes under the arm (at least one tumor deposit is larger than 2 mm).

N2b: The cancer has spread only to the internal mammary lymph nodes.

N3: The cancer has spread to 10 or more lymph nodes under the arm or to the infraclavicular lymph nodes (located under the collarbone) or to the internal mammary nodes with axillary node involvement.

N3a: The cancer has spread to 10 or more lymph nodes under the arm or to the infraclavicular lymph nodes.

N3b: The cancer has spread to internal mammary nodes and axillary nodes.

N3c: The cancer has spread to the supraclavicular lymph nodes.

If there is cancer in the lymph nodes, it also helps doctors to plan treatment to know how many lymph nodes are involved. The pathologist can determine the number of lymph nodes affected by cancer.

Distant metastasis. The “M” in the TNM system indicates whether the cancer has spread to other parts of the body.

MX: Distant spread cannot be evaluated.

M0: The disease has not metastasized.

M1: There is metastasis to another part of the body.

Cancer stage grouping

Doctors assign the stage of the cancer by combining the T, N, and M classifications.

Stage 0: Disease that has not spread past the natural boundaries of the breast. It is also called noninvasive cancer.

Stage I: The tumor is small and has not spread to the lymph nodes (T1, N0, M0).

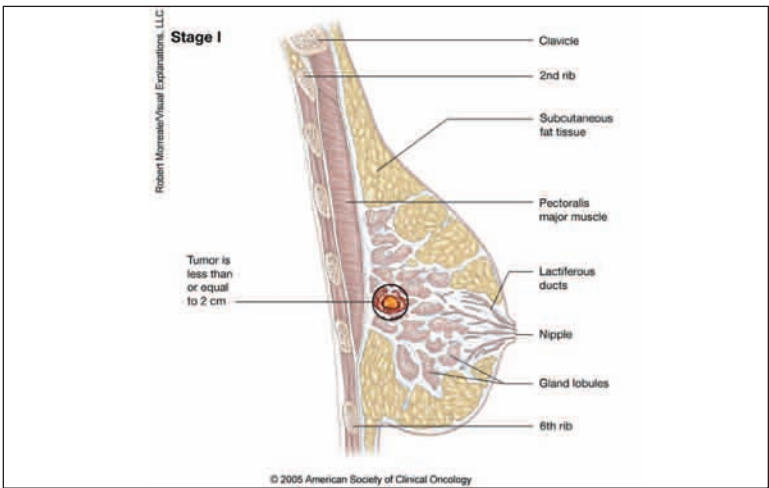


Illustration of breast cancer at stage I.

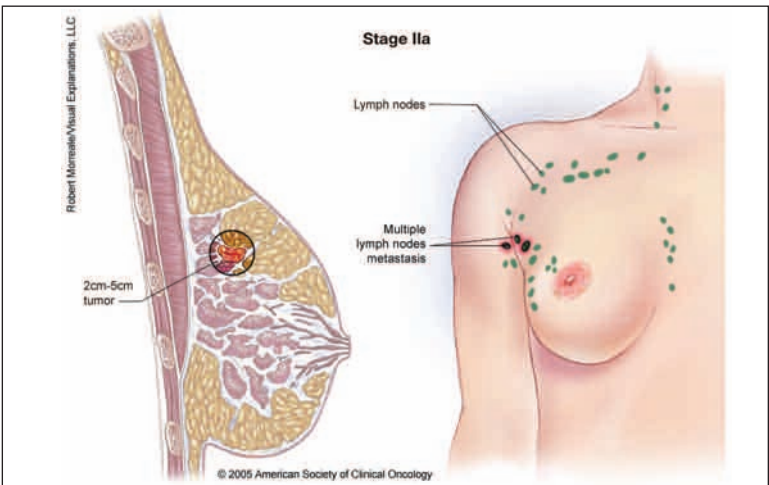


Illustration of breast cancer at stage IIa.

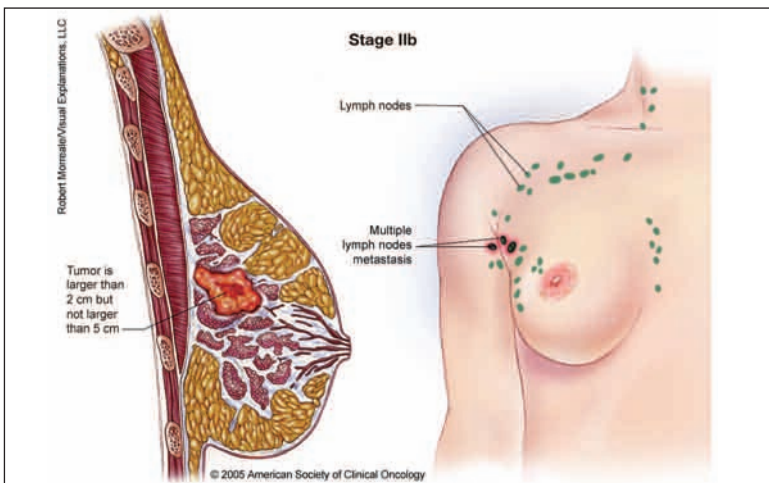


Illustration of breast cancer at stage IIb.

STAGING

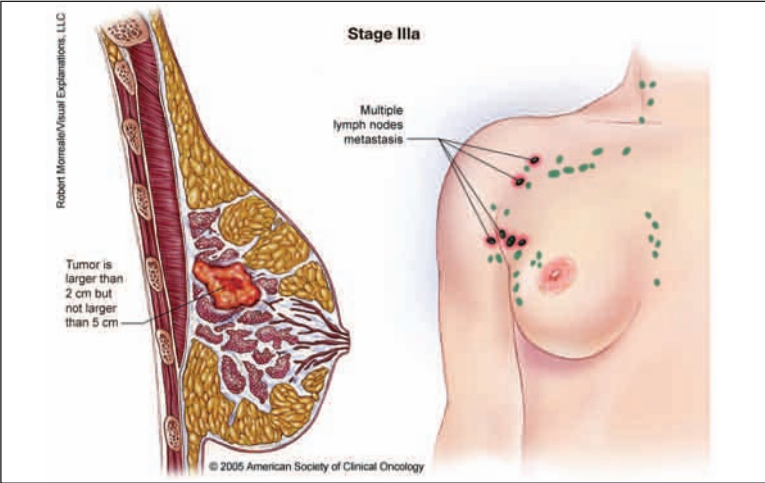


Illustration of breast cancer at stage IIIa.

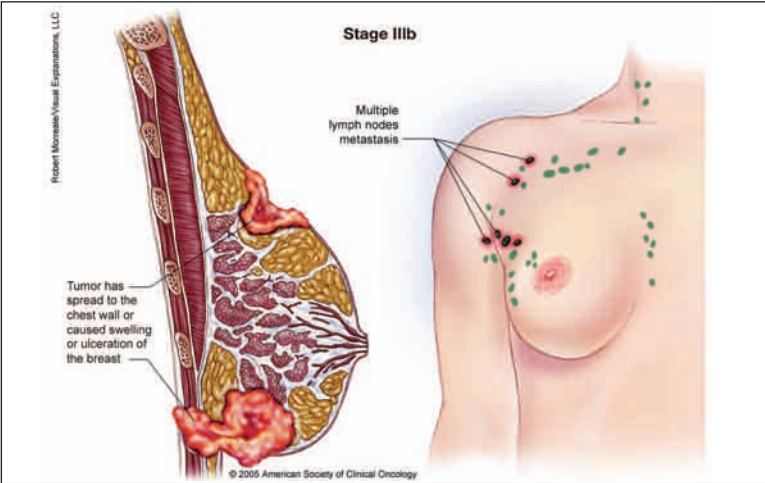


Illustration of breast cancer at stage IIIb.

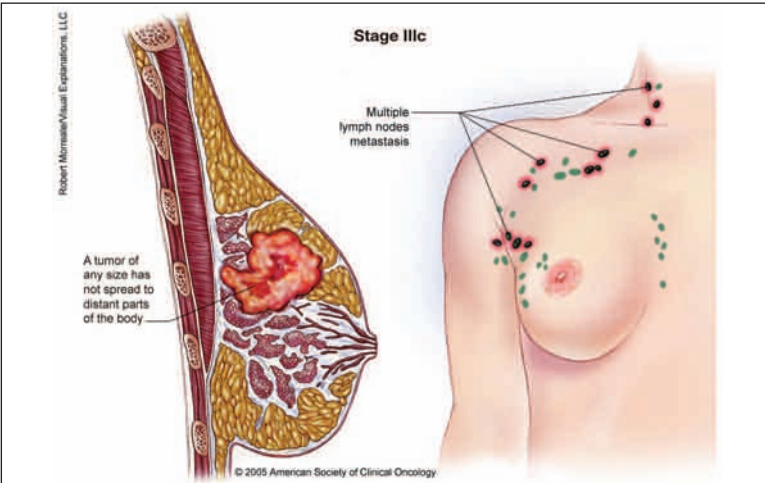


Illustration of breast cancer at stage IIIc.

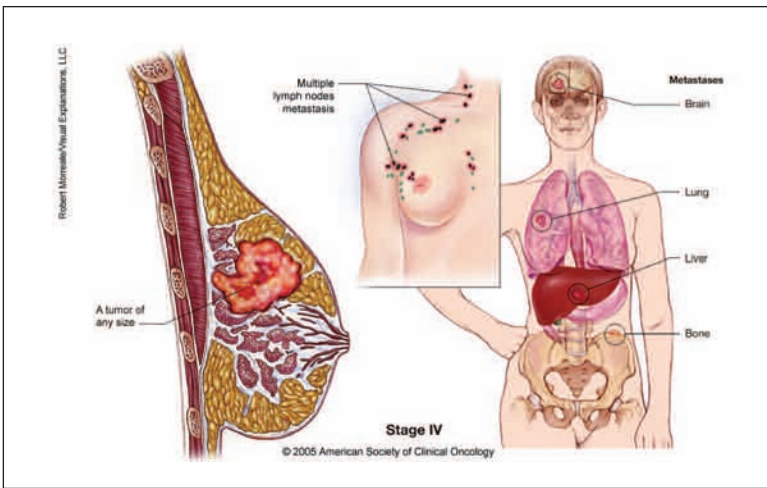


Illustration of breast cancer at stage IV.

Anatomical and staging illustrations for many types of cancer are available at www.cancer.net.

Stage IIa: Any one of these conditions:

- The tumor is smaller than or equal to 2 cm and has spread to the axillary lymph nodes under the arm (T1 or T1mic, N1, M0).
- The tumor is larger than 2 cm but not larger than 5 cm and has not spread to the axillary lymph nodes (T2, N0, M0).
- There is no evidence of a tumor in the breast, but there is cancer in the axillary lymph nodes (T0, N1, M0).

Stage IIb: Any one of these conditions:

- The tumor is larger than 2 cm but not larger than 5 cm and has spread to the axillary lymph nodes (T2, N1, M0).
- The tumor is larger than 5 cm but has not spread to the axillary lymph nodes (T3, N0, M0).

Stage IIIa: Any of these conditions:

- The tumor is smaller than 5 cm and has spread to the axillary lymph nodes (T1, N2, M0 or T2, N2, M0).
- The tumor is larger than 5 cm and has spread to the axillary lymph nodes (T3, N1, M0 or T3, N2, M0).

Stage IIIb: The tumor has spread to the chest wall or caused swelling or ulceration of the breast or is diagnosed as inflammatory breast cancer. It may or may not have spread to the lymph nodes under the arm, but has not spread to other parts of the body (T4, N0, M0; T4, N1, M0; or T4, N2, M0).

Stage IIIc: A tumor of any size that has not spread to distant parts of the body but has spread to the lymph nodes in the N3 group (any T, N3, M0).

Stage IV: The tumor can be any size and has spread to distant sites in the body, usually the bones, lungs or liver, or chest wall (any T, any N, M1).

Recurrent: Recurrent cancer is cancer that comes back after treatment.

Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original source for this material is the *AJCC Cancer Staging Manual Sixth Edition* (2002) published by Springer-Verlag New York, www.springer-ny.com.

TREATMENT

The treatment of breast cancer depends on the size and location of the tumor, whether the cancer has spread, and the person's overall health. In many cases, a team of doctors will work with the patient to determine the best treatment plan.

This section outlines treatments that are the standard of care (the best treatments available) for this specific type of cancer. Patients are also encouraged to consider clinical trials when making treatment plan decisions. A clinical trial is a research study to test a new treatment to prove it is safe, effective, and possibly better than standard treatment. Your doctor can help you review all treatment options. For more information, read the Clinical Trials section.

Overview of breast cancer treatment

The biology and behavior of a breast cancer affects the treatment. Some tumors are small but grow fast, while others are large and grow slower. When planning the treatment for breast cancer, the doctor will consider many factors, including:

- The stage and grade of the tumor
- The tumor's hormone receptor status (ER, PR) and HER2 status (see Diagnosis)
- The patient's age and general health
- The patient's menopausal status
- The presence of known mutations to breast cancer genes

Even though the doctor will specifically tailor the treatment for breast cancer for each patient, there are some general steps for treating breast cancer.

For DCIS and early-stage breast cancer, doctors generally recommend surgery to remove the tumor. To ensure the area around the tumor is free of cancer, the surgeon may also remove a small area of tissue around the tumor. The next step in the management of early-stage breast cancer is to lower the risk of recurrence (return of the cancer) and to get rid of any remaining cancer cells. This is called adjuvant therapy. Adjuvant therapies include radiation therapy, chemotherapy, hormone therapy, and targeted therapy. Although adjuvant therapy lowers the risk of recurrence, it does not necessarily eliminate it.

Along with staging, other sophisticated tools can help determine prognosis and help you and your doctor make decisions about

adjuvant therapy. The website Adjuvant! Online (www.adjuvantonline.com) is one such tool that your doctor can access to interpret a variety of prognostic factors. This website should only be used with the interpretation of your doctor.

When surgery to remove the cancer is not possible, chemotherapy, radiation therapy, hormone therapy, and/or targeted therapy may be used.

The treatment of recurrent cancer and metastatic cancer depends on how the cancer was first treated and the characteristics of the cancer mentioned above (such as ER, PR, and HER2 status).

More complete descriptions of each treatment option are listed below.

Surgery

Generally, the smaller the tumor, the more surgical options a patient has. The types of surgery include the following:

- A lumpectomy is the removal of the tumor and a small, clear (cancer-free) margin of tissue around the tumor. For DCIS and an invasive cancer, follow-up radiation therapy to the remaining breast tissue is recommended. A lumpectomy may also be called a partial mastectomy or a segmental mastectomy.
- A total mastectomy is the removal of the entire breast, but not the underarm lymph nodes. This surgery is also called a simple mastectomy.
- A modified radical mastectomy is the removal of the breast and underarm lymph nodes.
- Axillary lymph node dissection involves the surgeon removing lymph nodes from under the arm and having them examined by a pathologist for cancer cells. The actual number of nodes removed may vary.
- Sentinel lymph node biopsy is a procedure in which the surgeon finds and removes the sentinel (first) lymph node (generally one to three nodes) that receives drainage from the breast. The pathologist then examines it for cancer cells. To identify the sentinel lymph node, the surgeon injects a dye and/or a radioactive tracer into the area around the nipple. The dye or tracer will travel to the lymph nodes, arriving at the sentinel node first. The surgeon can find the node when it turns color (if the dye is used) or emits radiation (if the tracer is used). Sentinel lymph node biopsy often has a lower risk of lymphedema (swelling of the arm) than axillary lymph node dissection. If the sentinel node is cancer-free, research has shown that there is a good possibility that the subsequent nodes will also be free of cancer and no further surgery of the lymph nodes is performed. If the sentinel lymph node shows cancer is present, then the surgeon will perform an axillary lymph node dissection. For more information, read the ASCO Patient Guide: Sentinel Lymph Node Biopsy in Early Stage Breast Cancer at www.cancer.net/patientguides.
- Women who undergo a mastectomy may wish to consider breast reconstruction, which is surgery to rebuild the breast.

Reconstruction may be done with tissue from another part of the body, or with synthetic implants. A woman may be able to have this done at the same time as a mastectomy or at some point in the future.

Most patients with invasive cancer will undergo either sentinel lymph node biopsy or an axillary lymph node dissection. For those with sentinel nodes that indicate cancer, an axillary lymph node dissection is still considered necessary. Research is underway to determine if this continues to be true.

To summarize, surgical treatment options include the following:

- Lumpectomy or partial mastectomy and radiation therapy
- Total mastectomy, with or without immediate reconstruction, with or without sentinel node biopsy and possible axillary lymph node dissection
- Modified radical mastectomy with or without immediate reconstruction

Women are encouraged to talk with their doctors about which surgical option is right for them. More aggressive surgery (such as a mastectomy) is not always better and may result in additional complications. The combination of lumpectomy and radiation therapy has a higher risk of the cancer coming back in the same breast or near the breast, but the long-term survival of women is the same as those who have a mastectomy.

For more information, read the Cancer.Net Features: After a Mastectomy, After Treatment for Breast Cancer: Preventing Lymphedema, Breast Reconstruction, and Choosing a Breast Prosthesis at www.cancer.net/features.

Radiation therapy

Radiation therapy is the use of high-energy x-rays or other particles to kill cancer cells. Adjuvant radiation therapy is given regularly for a number of weeks after a lumpectomy or partial mastectomy to eliminate any remaining cancer cells near the tumor site or elsewhere within the breast. Adjuvant radiation therapy is also recommended for some women after a mastectomy depending on the size of their tumor, number of cancerous lymph nodes under the arm, and width of the tissue margin around the tumor removed by the surgeon. Adjuvant radiation therapy is effective in reducing the chance of breast cancer returning in both the breast and the chest wall. Neoadjuvant radiation therapy is radiation therapy given before surgery to shrink a large tumor, which makes it easier to remove, although this approach is rare.

Radiation therapy can cause side effects, including fatigue, swelling, and skin changes. A small amount of the lung can be affected by the radiation, although the risk of pneumonitis, or a radiation-related pneumonia, is rare. In the past, with older equipment and techniques of radiation therapy, women treated for left-sided breast cancers had a small increase in the long-term risk of heart disease. Modern techniques are now able to spare most of the heart from

radiation damage. While exposure to radiation is thought to be a risk factor for cancer after many years, less than one in 500 survivors will develop a different kind of cancer, other than a breast cancer, within the area that was treated. Clinical trials comparing lumpectomy and adjuvant radiation therapy with mastectomy have not shown a difference in the number of patients developing or dying of other cancers within a 20-year time span.

The most common type of radiation treatment is called external beam radiation therapy, which is radiation therapy given from a machine outside the body. When radiation treatment is given using implants, it is called internal radiation therapy or brachytherapy. In this treatment, small radioactive pellets are placed in or near the site of the breast tumor within plastic catheters placed temporarily in the breast. A balloon catheter placed near the breast that delivers radiation therapy (called Mammosite) is another type of radiation therapy.



Standard radiation therapy after a lumpectomy or partial mastectomy is external-beam radiation therapy given for five days (Monday through Friday) for six to seven weeks. This usually includes radiation therapy to the whole breast first for four and a half to five weeks, followed by a more focused treatment to the site of the tumor bed in the breast for the remaining treatments. This focused part of the treatment, called a boost, is standard for women with invasive breast cancer because it reduces the risk of a recurrence in the breast. This boost is also usually given for women with in situ breast cancer and is the subject of an ongoing international clinical trial. Standard radiation therapy after a mastectomy is given to the chest wall for five days (Monday through Friday) for five to six weeks. If there is evidence of cancer in the underarm lymph nodes, radiation therapy may also be given to the lymph node areas in the neck or underarm near the breast or chest wall.

There has been growing interest in newer radiation methods to shorten the length of treatment from six to seven weeks to periods of three to four weeks. In one method (called hypo-fractionated radiation therapy), a higher daily dose is given to the whole breast each day so that the overall length of treatment is shortened to three to four weeks. This can also be combined with a higher dose given to the tumor bed in the breast either during or after the whole breast radiation treatments. Clinical trials from Canada and the United Kingdom have shown that these shorter schedules can be equally accepted by patients with the same cancer control rates and side effects as longer radiation treatment schedules. These shorter schedules may become more accepted in the United States and are one way to improve the convenience and time required to complete a course of radiation (see also partial breast irradiation).

Partial breast irradiation. Partial breast irradiation (PBI) is radiation therapy that is given directly to the tumor area, usually after a lumpectomy, instead of the entire breast, as is routinely done with standard radiation therapy. This treatment can be done with external-beam radiation therapy or internal radiation therapy. Radiation is given twice a day for only one week using external-beam radiation, a temporary radiation catheter, or catheters implanted within the breast. Only some patients may be eligible for PBI. Although preliminary results have been promising, PBI is the subject of a large, nationwide clinical trial, and the results proving the safety and effectiveness compared with standard radiation therapy are pending.

Targeting the radiation to the tumor area more directly may shorten the amount of time that patients need to undergo radiation therapy. A large national clinical trial, which began in 2005, is being done to compare the standard treatment of six weeks of conventional external-beam radiation therapy with a one-week treatment of PBI.



Intensity-modulated radiation therapy.

Intensity-modulated radiation therapy (IMRT) is a more advanced way to deliver external-beam radiation therapy to the breast. The intensity of the radiation directed at the breast is varied to target the tumor more precisely, give a uniform distribution of radiation throughout the breast tissue, and avoid damaging healthy tissue. IMRT may reduce the dose to nearby important organs, such as the heart and

lung, and reduce the risks of some immediate side effects, such as peeling of the skin during treatment. This can be especially important for women with medium to large breast sizes, who are at greater risk for side effects such as peeling, compared with small-breasted women. IMRT also may help to reduce long-term effects on the breast tissue that were common with older radiation techniques such as hardness, swelling, or discoloration.

Two prospective, randomized clinical trials have compared IMRT to conventional radiation therapy after lumpectomy for women treated for breast cancer. Both studies showed an even distribution of radiation dose throughout the breast with IMRT. IMRT use also resulted in a decrease in areas of the breast that received a higher-than-desired dose of radiation, which led to a decrease in side effects. For example, in one clinical trial, there were fewer cases of moist peeling of the skin during IMRT. In the other clinical trial, there was an improvement in breast appearance and less fibrosis (hardness of the breast) five years after IMRT treatment. Additional research is being conducted to compare the long-term side effects, such as heart disease, between IMRT and conventional radiation therapy 10 years or more after treatment.

Adjuvant radiation therapy concerns for older patients and/or those with small tumors.

The lowest risks of cancer recurrence in the breast after lumpectomy are associated with the use of radiation therapy. Early randomized clinical trials showed, in general, recurrence rates of 30% or more without radiation therapy, compared with 10% recurrence rates with radiation therapy. More recent studies have looked at the consequences of using no radiation therapy for women age 70 or older or those with a small tumor size. Overall, these studies demonstrate that radiation therapy minimizes the risk of breast cancer recurrence in the same breast, compared with no radiation therapy, but does not affect overall survival. Guidelines from the National Comprehensive Cancer Network (NCCN) continue to recommend radiation as the standard option after lumpectomy. However, they also indicate that women with very favorable characteristics (such as being age 70 or older and having other medical conditions that could limit life expectancy within five years, a small tumor, no evidence of cancer in the lymph nodes or surgical margins, and an ER-positive cancer) could reasonably choose not to have radiation therapy and use hormone therapy alone after lumpectomy, if they are willing to accept a higher risk rate of local recurrence.

For more information on radiation therapy, read the Cancer.Net Features: Understanding Radiation Therapy, Radiation Therapy—Your Personal Experience, and Side Effects of Radiation Therapy at www.cancer.net/features.

Chemotherapy

Chemotherapy is the use of drugs to kill cancer cells. Systemic chemotherapy is delivered through the bloodstream, targeting cancer cells throughout the body. The side effects of chemotherapy depend on the individual and the drug and the dose used, but can include fatigue, hair loss, risk of infection, nausea and vomiting, loss of appetite, and diarrhea. These side effects usually go away once treatment is finished. Rarely, long-term side effects may occur, such as heart damage, nerve damage, or secondary cancers, but studies have shown that these side effects do not shorten a woman's survival time.

Chemotherapy may be given orally (by mouth) or intravenously (injected into a vein) and is usually given in cycles. Chemotherapy generally does not require a hospital stay; it is given in an outpatient setting. Chemotherapy may be neoadjuvant therapy (given before surgery to shrink a large tumor) or adjuvant therapy (given after surgery to reduce the risk that the cancer returns). Chemotherapy may also be given at the time of a breast cancer recurrence. Patients in clinical trials may be offered new drugs or new combinations of existing drugs.

Different drugs are useful for different cancers, and research has shown that combinations of certain drugs are more effective than individual ones. The following drugs or combinations of drugs may be used as adjuvant therapy to treat breast cancer:

TREATMENT

- Cyclophosphamide (Cytoxan, Neosar)
- Methotrexate (multiple brand names)
- Fluorouracil (5-FU, Adrucil)
- Doxorubicin (Adriamycin)
- Epirubicin (Ellence)
- Paclitaxel (Taxol)
- Docetaxel (Taxotere)
- CMF (cyclophosphamide, methotrexate, and 5-FU)
- CAF (cyclophosphamide, doxorubicin, and 5-FU)
- CEF (cyclophosphamide, epirubicin, and 5-FU)
- EC (epirubicin and cyclophosphamide)
- AC (doxorubicin and cyclophosphamide)
- TAC (docetaxel, doxorubicin, and cyclophosphamide)
- AC followed by T (doxorubicin and cyclophosphamide, followed by paclitaxel)
- TC (docetaxel and cyclophosphamide)

Trastuzumab, a targeted therapy, may also be given after chemotherapy as an adjuvant treatment. Also, paclitaxel, docetaxel, and carboplatin (Paraplat, Paraplatin) may be given after standard adjuvant chemotherapy.

In addition to the drugs and combinations of drugs listed above, the following may be used to treat recurrent breast cancer and metastatic breast cancer:

- Vinorelbine (Navelbine)
- Capecitabine (Xeloda)
- Protein bound paclitaxel (Abraxane)
- Pegylated liposomal doxorubicin (DOXIL, Dox-SL, Evacet, LipoDox)
- Gemcitabine (Gemzar)
- Carboplatin
- AT (doxorubicin and docetaxel; doxorubicin and paclitaxel)
- GT (gemcitabine and paclitaxel)
- Docetaxel and capecitabine
- Ixabepilone (Ixempra)

Trastuzumab, lapatinib (Tykerb), or bevacizumab (Avastin) may be given with chemotherapy in particular situations.

The medications used to treat cancer are continually being evaluated. Talking with your doctor is often the best way to learn about the medications prescribed for you, their purpose, and their potential side effects or interactions. Learn more about your prescriptions through Cancer.Net's online Drug Information Resources section, which provides links to multiple drug databases at www.cancer.net/druginfresources.

Hormone therapy

Hormone therapy is useful to manage a tumor that tests positive for either estrogen or progesterone receptors for both early-stage and metastatic cancer. This type of tumor uses hormones to fuel its growth. Blocking the hormones usually limits the growth of the tumor.

If it is determined that the tumor is hormone receptor-positive (uses estrogen or progesterone to grow [see Diagnosis]), then adjuvant

hormone treatment may be used alone or after chemotherapy. Examples of hormone therapy used as adjuvant therapy are tamoxifen, anastrozole (Arimidex), letrozole (Femara), and exemestane (Aromasin).

Tamoxifen is the drug that researchers have studied the longest for use as a hormone therapy. It blocks estrogen from binding to breast cancer cells. It has been shown to be effective for reducing the risk of recurrence in the treated breast, the risk of developing cancer in the other breast, and the risk of developing cancer in women with no history of the disease but who are at higher than average risk for developing breast cancer. Current research shows that there is no benefit of taking tamoxifen longer than five years.

The side effects of tamoxifen include hot flashes, a small increased risk of uterine (endometrial) cancer and uterine sarcoma, and an increase in the risk of blood clots. Tamoxifen can be effective for both premenopausal and postmenopausal women.

In postmenopausal women who have an increased risk of developing breast cancer, raloxifene has shown to be another hormone therapy that is as effective as tamoxifen in preventing invasive breast cancer, but not as effective in preventing noninvasive cancer, such as DCIS. The side effects of raloxifene include a small risk of blood clots, leg and joint pain, hot flashes, pain during sexual intercourse, and vaginal dryness. Raloxifene has not been studied in premenopausal women, and it is not considered a substitute for tamoxifen for adjuvant therapy for women with hormone receptor-positive breast cancer.

An aromatase inhibitor (AI) decreases the amount of estrogen in postmenopausal women by blocking the aromatase enzyme, which is needed to make estrogen. These drugs include anastrozole, letrozole, and exemestane. The side effects of AIs may include joint pain and an increased risk of fractures (broken bones). Clinical trials are evaluating whether women benefit from an AI after tamoxifen, or by taking an AI for more than five years. For more information about AIs, please read the ASCO Technology Assessment for Patients: Aromatase Inhibitors for Early Breast Cancer at www.cancer.net/patientguides.

Targeted therapy

Targeted therapy is a treatment that targets faulty genes or proteins that contribute to cancer growth and development.

- Trastuzumab is approved for both the treatment of advanced breast cancer and as an adjuvant therapy for early-stage breast cancer for tumors that have too much of the HER2 protein, called HER2 positive. Data presented at the 2005 American Society of Clinical Oncology Annual Meeting demonstrated an approximate 50% decrease in recurrence and an improvement in survival for women with HER2-positive early breast cancer who received trastuzumab either with or after adjuvant chemotherapy. At this time, one year of trastuzumab is recommended. Patients

receiving trastuzumab have a 4% risk of heart problems, and this risk is increased if a patient has other risk factors for heart disease. These heart problems do not always go away, but they are usually treatable with medication. Ongoing research is evaluating how much trastuzumab is enough (from nine weeks up to two years).

- For women with HER2-positive breast cancer that no longer responds to trastuzumab, a drug called lapatinib may slow the growth of breast cancer when combined with capecitabine. The combination of lapatinib and capecitabine is approved for the treatment of women with advanced or metastatic HER2-positive breast cancer who have previously been treated with chemotherapy and trastuzumab.
- Bevacizumab is used to treat metastatic or recurrent breast cancer (see below). This drug blocks angiogenesis (the formation of new blood vessels), which is needed for tumor growth and metastasis. When combined with paclitaxel, bevacizumab appears to shrink the tumor and remain smaller for a longer time in women whose breast cancer has spread compared with paclitaxel alone. This combination was approved by the U.S. Food and Drug Administration in 2008.

Recurrent and metastatic breast cancer

Breast cancer is called recurrent if the cancer has come back after it was first diagnosed and treated. It may come back in the breast (a local recurrence); in the chest wall; or in another part of the body, including distant organs (such as the lungs, liver, and bones). Some patients live years after a recurrence of breast cancer.

Breast cancer may also spread to other organs such as the brain, the opposite breast, adrenal glands, spleen, and ovaries and is called metastatic breast cancer. This type of cancer is treatable, but not curable. The goal of treatment for advanced disease is to achieve remission (temporary or permanent absence of disease) or slow the growth of the tumor.

Generally, a recurrence is detected when a person has symptoms. Even though there are tests that may detect a metastatic recurrence before the onset of symptoms, research has shown that having such tests does not improve the response to treatments used for advanced disease, nor do they prolong life.

Signs and symptoms depend on the site of the recurrence and may include:

- A lump under the arm or along the chest wall
- Bone pain or fractures, which may signal bone metastases
- Headaches or seizures, which may signal brain metastases
- Chronic coughing or trouble breathing, which may signal lung metastases

Other symptoms may be related to the location of metastasis and may include changes in vision, changes in energy levels, feeling ill, or extreme fatigue. A biopsy of the recurrent site is often

recommended to be certain of the diagnosis and to check for ER, PR, and HER2 status, because this may have changed from the time of the original diagnosis.

The treatment of metastatic or recurrent breast cancer depends on the previous treatment(s) and the characteristics of the tumor (such as ER, PR, and HER2 status). For women with a recurrence within the breast after initial treatment with lumpectomy and adjuvant radiation therapy, the treatment is mastectomy. For women with a recurrence in the chest wall after an initial mastectomy, resection (surgical removal of the recurrence) followed by radiation therapy to the chest wall and lymph nodes is the treatment, unless radiation therapy has already been given (radiation therapy cannot be given to the same area more than once). Often hormone therapy is used if appropriate. Chemotherapy and targeted therapies may also be used to treat metastatic cancer. Radiation therapy and surgery may be used in certain situations for women with a distant metastatic recurrence.

Treatment guides from ASCO for breast cancer include Aromatase Inhibitors for Early Breast Cancer, Bisphosphonates for Breast Cancer, Follow-Up Care for Breast Cancer, HER2 Testing for Breast Cancer, Sentinel Lymph Node Biopsy for Early-Stage Breast Cancer, and Breast Cancer Tumor Markers at www.cancer.net/patientguides.

To learn about the terms used in this section, read the Cancer.Net Feature: Cancer Terms to Know: During Treatment at www.cancer.net/features.

For More Information

The NCCN also has a series of treatment guidelines that have been translated into patient-friendly language. In accordance with Cancer.Net's Linking Policy, please note that this link does not imply ASCO's endorsement of the content, but rather it is an effort to provide additional information that may be helpful to people living with cancer and their families. The NCCN treatment guide for breast cancer can be found at www.nccn.org.

CLINICAL TRIALS RESOURCES

Doctors and scientists are always looking for better ways to treat patients with breast cancer. A clinical trial is a way to test a new treatment to prove that it is safe, effective, and possibly better than a standard treatment. Patients who participate in clinical trials are among the first to receive new treatments before they are widely available. However, there is no guarantee that the new treatment will be safe, effective, or better than a standard treatment.

Patients decide to participate in clinical trials for many reasons. For some patients, a clinical trial is the best treatment option available. Because standard treatments are not perfect, patients are often willing to face the added uncertainty of a clinical trial in the hope of a better result. Other patients volunteer for clinical trials because they

SIDE EFFECTS

know that finding new drugs and other therapies is the only way to make progress in treating breast cancer. Even if they do not benefit directly from the clinical trial, their participation may benefit future patients with breast cancer.

To join a clinical trial, patients must complete a learning process known as informed consent. During informed consent, the doctor should list all of the patient's options, so that the person understands the standard treatment, and how the new treatment differs from the standard treatment. The doctor must also list all of the risks of the new treatment, which may or may not be different from the risks of standard treatment. Finally, the doctor must explain what will be required of each patient in order to participate in the clinical trial, including the number of doctor visits, tests, and the schedule of treatment. Learn more about clinical trials, including patient safety, phases of a clinical trial, deciding to participate in a clinical trial, questions to ask the research team, and links to find cancer clinical trials at www.cancer.net/clinicaltrials.

SIDE EFFECTS

Cancer and its treatment can cause a variety of side effects. However, doctors have made major strides in recent years in reducing pain, nausea and vomiting, infection, fatigue, and other physical side effects of cancer treatments. Many treatments used today are less intensive but as effective as treatments used in the past. Doctors also have many ways to provide relief to patients when such side effects do occur.

Fear of treatment side effects is common after a diagnosis of cancer, but it may be helpful to know that preventing and controlling side effects is a major focus of your health-care team. Before treatment begins, talk with your doctor about possible side effects of the specific treatments you will be receiving. The specific side effects that can occur depend on a variety of factors, including the type of cancer, its location, the individual treatment plan (including the length and dosage of treatment), and the person's overall health.

Ask your doctor which side effects are most likely to happen (and which are not), when side effects are likely to occur, and how they will be addressed by the health-care team if they do happen. Also, be sure to communicate with the doctor about side effects you experience during and after treatment. For more information on the most common side effects of cancer and different treatments, along with ways to prevent or control them, visit Cancer.Net's section on Managing Side Effects, based on ASCO's curriculum, at www.cancer.net/sideeffects.

In addition to physical side effects, there may be psychosocial (emotional and social) effects as well. Learn more about the

importance of addressing these needs in Cancer.Net's section on Caring for the Whole Patient at www.cancer.net/patientcare.

For more information on late effects or long-term side effects, please read the After Treatment section or talk with your doctor.

AFTER TREATMENT

After treatment for breast cancer ends, talk with your doctor about developing a follow-up care plan. This plan may include regular physical examinations and/or medical tests to monitor your recovery for the coming months and years. The recommendations for breast cancer follow-up care usually include regular physical examinations and mammograms. Specific information can be found in the ASCO Patient Guide: Follow-up Care for Breast Cancer at www.cancer.net/patientguides. In addition, ASCO offers forms to help keep track of the breast cancer treatment you received and develop a survivorship care plan once treatment ends. Read more about the ASCO Cancer Treatment Summaries at www.cancer.net/treatmentsummaries.

Breast cancer can come back in the breast or other areas of the body. The symptoms of a cancer recurrence include a new lump in the breast, under the arm, or along the chest wall; bone pain or fractures; headaches or seizures; chronic coughing or trouble breathing; extreme fatigue; and/or feeling ill. Talk with your doctor if you have these or other symptoms. The possibility of recurrence is a common concern among cancer survivors; learn more about Coping With Fear of Recurrence at www.cancer.net/coping.

After surgery (mastectomy or lumpectomy) to treat breast cancer, the breast may be scarred and may have a different shape or size than before surgery. If lymph nodes were removed as part of the surgery or affected during treatment, lymphedema (swelling of the arm) may occur. Read the Cancer.Net Features: After Treatment for Breast Cancer: Preventing Lymphedema, After a Mastectomy: What to Know, After Treatment for Breast Cancer: Breast Reconstruction, and After Treatment for Breast Cancer: Choosing a Breast Prosthesis at www.cancer.net/features.

Some patients experience breathlessness, a dry cough, and/or chest pain two to three months after finishing radiation therapy because the treatment can cause swelling and fibrosis (hardening or thickening) of the lungs. These symptoms are usually temporary. Talk with your doctor if you develop any new symptoms after radiation therapy or if the side effects are not going away.

Women taking tamoxifen should have yearly pelvic exams, because this drug can increase the risk of uterine cancer. Tell your doctor or nurse if you notice any abnormal vaginal bleeding or other new symptoms. Women who are taking an aromatase inhibitor, such as anastrozole, exemestane, or letrozole, should have a bone density test

before they start treatment and as recommended by their doctor, as these drugs may cause some bone weakness or bone loss.

Women recovering from breast cancer are encouraged to follow established guidelines for good health, such as maintaining a healthy weight, not smoking, eating a balanced diet, and having recommended cancer screening tests. Talk with your doctor to develop a plan that is best for your needs. Moderate physical activity can help rebuild your strength and energy level and lowers the risk of recurrence. Your doctor can help you create a safe exercise plan based upon your needs, physical abilities, and fitness level. Learn more about Healthy Living After Cancer at www.cancer.net/features.

To learn about the terms used in this section, read the Cancer.Net Feature: Cancer Terms to Know: After Treatment at www.cancer.net/features.

CURRENT RESEARCH

Research for breast cancer is ongoing. The following advances may still be under investigation in clinical trials and may not be approved or available at this time. Always discuss all diagnostic and treatment options with your doctor.

- New surgical methods that save tissue or prevent scarring are being tested in clinical trials. A skin-sparing mastectomy may result in less scarring than traditional surgery.
- Improved radiation therapy, to lower the risk of side effects.
- New therapies and combinations of therapies, including chemotherapy, hormone therapy, and targeted therapy are being studied in clinical trials.

QUESTIONS TO ASK THE DOCTOR

Regular communication with your doctor is important in making informed decisions about your health care. Consider asking the following questions of your doctor:

- What type of breast cancer do I have?
- Can you explain my pathology report (laboratory test results) to me?
- What is the size of the tumor?
- Has the cancer spread to my lymph nodes or anywhere else in my body?
- What is the hormone status of my tumor? What does this mean?

- What is my HER2 status? What does this mean?
- What is the grade and stage of this disease? What does this mean?
- What are my options for treatment?
- What clinical trials are available to me?
- Could I have a lumpectomy?
- Do I need a mastectomy? If so, would you recommend an immediate breast reconstruction (plastic surgery)?
- What is the expected timeline for each treatment option?
- What is a sentinel lymph node biopsy? What are the benefits and risks? Would you recommend it for me?
- What is the risk of lymphedema with a sentinel lymph node biopsy? With axillary lymph node dissection?
- What are the possible side effects of each treatment option, both in the short term and the long term?
- How will this treatment affect my daily life? Will I be able to work, exercise, and perform my usual activities?
- What can I do to ease side effects?
- Whom can I call if I have a problem or question about my treatment?
- What follow-up tests will I need, and how often will I need them?
- How will you determine if the cancer has come back after treatment?
- What support services are available to me? To my family?

Additional questions to ask your doctors can be found at www.cancer.net/breast.

PATIENT INFORMATION RESOURCES

American Society of Breast Disease

www.asbd.org

Breastcancer.org

www.breastcancer.org

Breastlink

www.breastlink.com

Fertile Hope

www.fertilehope.org

FORCE: Facing Our Risk of Cancer Empowered

www.facingourrisk.org

HER2 Support Group

www.her2support.org

Inflammatory Breast Cancer Research Foundation

www.ibcresearch.org

Living Beyond Breast Cancer

www.lbbsc.org

Mothers Supporting Daughters with Breast Cancer

www.mothersdaughters.org

National Breast Cancer Coalition

www.stopbreastcancer.org

National Cancer Institute

www.cancer.gov

National Comprehensive Cancer Network

www.nccn.org

National Lymphedema Network

www.lymphnet.org

Nueva Vida, Inc.

www.nueva-vida.org

SHARE: Self-help for Women with Breast or Ovarian Cancer

www.sharecancersupport.org

Sisters Network, Inc.

www.sistersnetworkinc.org

Susan G. Komen for the Cure

www.komen.org

Young Survival Coalition

www.youngsurvival.org



Dear Partner in the Fight Against Breast Cancer,

The ASCO Cancer Foundation is the philanthropic arm of the American Society of Clinical Oncology (ASCO), which is composed of over 25,000 oncologists who are the leaders in advancing cancer care in the 21st century. The ASCO Cancer Foundation is dedicated to improving the lives of people with cancer through programs that support cutting-edge research and education in oncology. With the support of the cancer community and the public at large, The ASCO Cancer Foundation is making a world of difference in cancer care.

The Foundation's charitable mission is founded upon four core tenets: (1) research is at the heart of progress against cancer, (2) cutting-edge knowledge is essential when it comes to treating people with cancer, (3) getting good cancer care starts with getting good cancer information, and (4) all cancer patients deserve access to the best possible care.

This year we are celebrating over 25 years of investigator support through our grants programs. We have awarded over \$40 million in grants since 1984 to over 600 worthy clinical researchers. We are pleased to be able to increase our grants opportunities each year, but we always have more fundable grant applications than we are able to fund.

The ASCO Cancer Foundation is also very proud to provide support for ASCO's patient information resources including the award-winning website: Cancer.Net (www.cancer.net). Cancer.Net was developed and approved by the cancer doctors at ASCO, making it the most up-to-date and trusted resource for cancer information on the Internet.

If you are a current supporter of The ASCO Cancer Foundation, *thank you!* For those of you who have not partnered with The ASCO Cancer Foundation before, we invite you to join us now. Although we have accomplished much, there is still much more to achieve in research, patient education, and quality of care. There are many ways you can help us make advances and together we will *make a world of difference in cancer care*.

Warmest regards,

Susan Braun
Executive Director
The ASCO Cancer Foundation

PS: To learn more or support the work of The ASCO Cancer Foundation, please visit our website: www.ascocancerfoundation.org or call us at 888-220-2839.



The ASCO Cancer Foundation is the philanthropic arm of the American Society of Clinical Oncology (ASCO), which is composed of over 25,000 oncologists globally who are the leaders in advancing cancer care in the 21st century. The ASCO Cancer Foundation is dedicated to improving the lives of people with cancer through programs that support cutting-edge research and education in oncology. The ASCO Cancer Foundation is the torch bearer for the next generation of oncology researchers and the purveyor of knowledge to people with cancer. With the support of the cancer community and the public at large, The ASCO Cancer Foundation is *making a world of difference in cancer care.*



American Society of Clinical Oncology

The American Society of Clinical Oncology (ASCO) is the world's leading professional organization representing physicians of all oncology subspecialties who care for people with cancer.

2318 Mill Road, Suite 800
Alexandria, Virginia 22314
571-483-1300
571-366-9530 (fax)

For information about ASCO's patient information resources, call toll free 888-651-3038 or email contactus@cancer.net.