

Breast Cancer

Treatment Guidelines for Patients

Version VIII/September 2006



Current ACS/NCCN Treatment Guidelines for Patients

Advanced Cancer and Palliative Care Treatment Guidelines for Patients (English and Spanish)

Bladder Cancer Treatment Guidelines for Patients (English and Spanish)

Breast Cancer Treatment Guidelines for Patients (English and Spanish)

Cancer Pain Treatment Guidelines for Patients (English and Spanish)

Cancer-Related Fatigue and Anemia Treatment Guidelines for Patients (English and Spanish)

Colon and Rectal Cancer Treatment Guidelines for Patients (English and Spanish)

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Nausea and Vomiting Treatment Guidelines for Patients With Cancer (English and Spanish)

Non-Hodgkin's Lymphoma Treatment Guidelines for Patients (English and Spanish)

Ovarian Cancer Treatment Guidelines for Patients (English and Spanish)

Prostate Cancer Treatment Guidelines for Patients (English and Spanish)

Breast Cancer

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Version VIII/September 2006

The mutual goal of the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS) partnership is to provide patients with state-of-the-art cancer treatment information in an easy to understand language. This information, based on the NCCN's Clinical Practice Guidelines, is intended to assist you in a discussion with your doctor. These guidelines do not replace the expertise and clinical judgment of your doctor.

NCCN Clinical Practice Guidelines were developed by a diverse panel of experts. The guidelines are a statement of consensus of its authors regarding the scientific evidence and their views of currently accepted approaches to treatment. The NCCN guidelines are updated as new significant data become available. The Patient Information version is updated accordingly and available on-line through the American Cancer Society and NCCN Web sites. To ensure you have the most recent version, you may contact the American Cancer Society at 1-800-ACS-2345 or the NCCN at 1-888-909-NCCN.

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Introduction

With this booklet, women with breast cancer have access to information on the way breast cancer is treated at the nation's leading cancer centers. Originally developed for cancer specialists by the National Comprehensive Cancer Network (NCCN), these treatment guidelines have now been translated for the public by the American Cancer Society.

Since 1995, doctors have looked to the NCCN for guidance on the highest quality, most effective advice on treating cancer. For more than 90 years, the public has relied on the American Cancer Society for information about cancer. The Society's books and brochures provide comprehensive, current, and understandable information to hundreds of thousands of patients, their families and friends. This collaboration between the NCCN and ACS provides an authoritative and understandable source of cancer treatment information for the public. These patient guidelines will help you better understand your cancer treatment and your doctor's counsel. We urge you to discuss them with your doctor. To make the best possible use of this information, you might begin by asking your doctor the following questions:

- How large is my cancer? Do I have more than one tumor in the breast?
- What is my cancer's *grade* (how abnormal the cells appear) and *histology* (type and arrangement of tumor cells) as seen under a microscope?
- Do I have any *lymph nodes* with cancer (positive lymph nodes, i.e. *nodal status*)? If yes, how many?
- What is the *stage* of my cancer?

- Does my cancer contain *hormone receptors*? What does this mean for me?
- Is my cancer positive for *HER-2*? What does this mean for me?
- Is *breast-conserving treatment* an option for me?
- In addition to surgery, what other treatment do you recommend? *Radiation? Chemotherapy? Hormone therapy?*
- What are the *side effects*?
- Are there any *clinical trials* that I should consider?

Making Decisions About Breast Cancer Treatment

On the pages after the general information about breast cancer, you'll find flow charts that doctors call decision trees. The charts represent different stages of breast cancer. Each one shows you step-by-step how you and your doctor can arrive at the choices you need to make about your treatment.

Here you will find background information on breast cancer with explanations of cancer stage, work-up, and treatment—all categories used in the flow charts. We've also provided a glossary at the end of the booklet. Words in the glossary will appear in italics when first mentioned in this booklet.

Although breast cancer is a very serious disease, it can be treated, and it should be treated by a team of health care professionals with experience in treating women with breast cancer. This team may include a surgeon, radiation oncologist, medical oncologist, radiologist, pathologist, oncology nurse, social worker, and others. But not all women

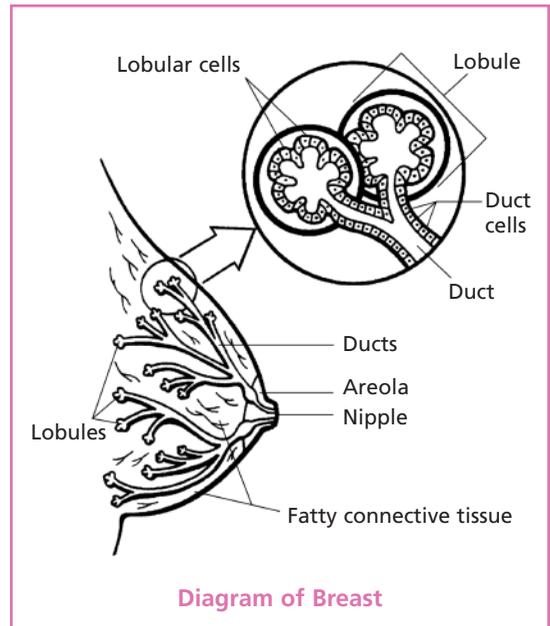
with breast cancer receive the same treatment. Doctors must consider a woman's specific medical situation and the patient's preferences. This booklet can help you and your doctor decide which choices best meet your medical and personal needs.

Breast cancer can occur in men. Since the incidence is very low, this booklet is for women with breast cancer. To learn more about breast cancer in men, speak with your doctor and contact the American Cancer Society at 1-800-ACS-2345 or visit our Web site at www.cancer.org.

Inside Breast Tissue

The main parts of the female breast are lobules (milk producing glands), *ducts* (milk passages that connect the lobules and the nipple), and stroma (fatty tissue and ligaments surrounding the ducts and lobules, blood vessels, and lymphatic vessels). Lymphatic vessels are similar to veins but carry lymph instead of blood. Most breast cancer begins in the ducts (*ductal*), some in the lobules (*lobular*), and the rest in other breast tissues.

Lymph is a clear fluid that has tissue waste products and immune system cells. Most lymphatic vessels of the breast lead to under-arm (axillary) lymph nodes. Some lead to lymph nodes above the collarbone (called *supraclavicular*) and others to internal mammary nodes which are next to the breastbone (or sternum). Cancer cells may enter lymph vessels and spread along these vessels to reach lymph nodes. Cancer cells may also enter blood vessels and spread through the bloodstream to other parts of the body.



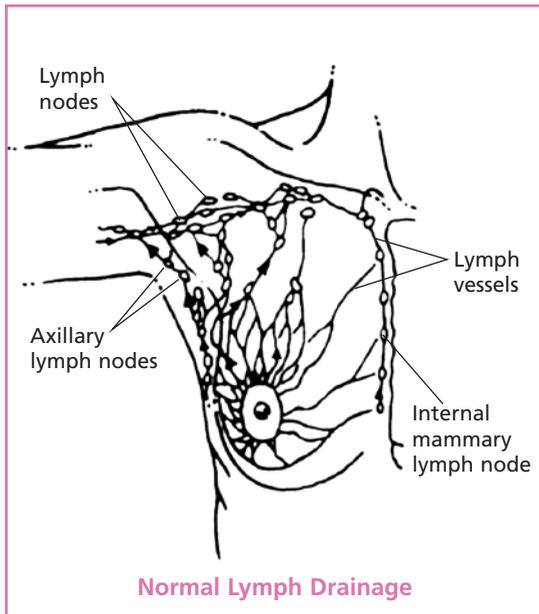
Source: American Cancer Society, 2006

Lymph nodes are small, bean shaped collections of immune system cells important in fighting infections. When breast cancer cells reach the axillary lymph nodes, they can continue to grow, often causing swelling of the lymph nodes in the armpit or elsewhere.

If breast cancer cells have spread to the axillary lymph nodes, it makes it more likely that they have spread to other organs of the body as well.

Types of Breast Cancer

Breast cancer is an abnormal growth of cells that normally line the ducts and the lobules. Breast cancer is classified by whether the cancer started in the ducts or lobules, whether the cells have "invaded" (grown or spread) through the duct or lobule, and the way the cancer cells look under a microscope.



Source: American Cancer Society, 2006

Breast cancers are broadly grouped into those that are still in the breast lobules or ducts (referred to as “noninvasive” or “*carcinoma in situ*”) and those that have spread beyond the walls of the ducts or lobules (referred to as “infiltrating” or “invasive”). It is not unusual for a single breast tumor to have combinations of these types, and to have a mixture of invasive and non-invasive cancer.

Carcinoma In Situ

Carcinoma is another word for cancer and *carcinoma in situ* (CIS) means that the cancer is a very early cancer and it is still confined to the ducts or lobules where it started. It has not spread into surrounding fatty tissues in the breast or to other organs in the body. There are 2 types of breast carcinoma in situ:

- **Lobular carcinoma in situ (LCIS):** Also called lobular neoplasia. It begins in the lobules, but has not grown through the

lobule walls. Breast cancer specialists do not think that LCIS itself becomes an invasive cancer, but women with this condition do run a higher risk of developing an invasive cancer in either breast.

- **Ductal carcinoma in situ (DCIS):** This is the most common type of noninvasive breast cancer. In DCIS, cancer cells inside the ducts do not spread through the walls of the ducts into the fatty tissue of the breast. DCIS is treated with surgery and sometimes radiation, which are usually curative. If not treated, DCIS may grow and become an invasive cancer.

Invasive Breast Cancers

Invasive cancer describe those cancers that have started to grow and have spread beyond the ducts or lobules. These cancers are divided into different types of invasive breast cancer depending on how the cancer cells look under the microscope. They are also grouped according to how closely they look like normal cells. This is called the *grade* which helps predict whether the woman has a good or less favorable outlook. Outlook is referred to as *prognosis*.

Invasive (also called Infiltrating) Ductal Carcinoma (IDC)

The cancer starts in a milk passage, or duct, of the breast, but then the cancer cells break through the wall of the duct and spread into the fatty tissue. Cancer cells can then spread into lymphatic channels or blood vessels of the breast and to other parts of the body. About 80% of all breast cancers are invasive ductal carcinoma.

Invasive (also called Infiltrating) Lobular Carcinoma (ILC)

This type of cancer starts in the milk-producing glands. Like IDC, this cancer can spread beyond the breast to other parts of the body. About 10% to 15% of invasive breast cancers are invasive lobular carcinomas.

Mixed Tumors

Mixed tumors describe those that contain a variety of cell types, such as invasive ductal combined with invasive lobular breast cancer. With this type, the tumor is usually treated as if it were an invasive ductal cancer.

Medullary Cancer

This special type of infiltrating ductal cancer has a fairly well-defined boundary between tumor tissue and normal breast tissue. It also has a number of special features, including the presence of immune system cells at the edges of the tumor. It accounts for about 5% of all breast cancer. It can be difficult to distinguish medullary breast cancer from the more common invasive ductal breast cancer. Most cancer specialists think that medullary cancer is very rare, and that cancers that are called medullary cancer should be treated as invasive ductal breast cancer.

Metaplastic Tumors

Metaplastic tumors are a very rare type of invasive ductal cancer. These tumors include cells that are normally not found in the breast, such as cells that look like skin cells (squamous cells) or cells that make bone. These tumors are treated similarly to invasive ductal cancer.

Inflammatory Breast Cancer (IBC)

Inflammatory breast cancer is a special type of breast cancer in which the cancer cells have spread to the lymph channels in the skin of the breast. Inflammatory breast cancer accounts for about 1% to 3% of all breast cancers. The skin of the affected breast is red, swollen, may feel warm, and has the appearance of an orange peel. The affected breast may become larger or firmer, tender, or itchy. IBC is often mistaken for infection in its early stages.

Inflammatory breast cancer has a higher chance of spreading and a worse outlook than typical invasive ductal or lobular cancer. Inflammatory breast cancer is always staged as stage IIIB unless it has already spread to other organs at the time of diagnosis which would then make it a stage IV. (See discussion of stage on page 14).

Colloid Carcinoma

This rare type of invasive ductal breast cancer, also called mucinous carcinoma, is formed by mucus-producing cancer cells. Colloid carcinoma has a better outlook and a lower chance of *metastasis* than invasive lobular or invasive ductal cancers of the same size.

Tubular Carcinoma

Tubular carcinoma is a special type of invasive ductal breast carcinoma. About 2% of all breast cancers are tubular carcinomas. Women with this type of breast cancer have a better outlook because the cancer is less likely to spread outside the breast than invasive lobular or invasive ductal cancers of the same size. The majority of tubular cancers are hormone receptor positive and HER-2 negative. (See discussion of tumor tests, on page 12.)

Breast Cancer Work Up

Evaluating a Breast Lump or Abnormal Mammogram Finding

An evaluation of a breast lump or an abnormal mammogram finding includes a thorough medical history, a physical examination, and breast imaging (such as x-rays). A biopsy is needed for a suspicious finding, though often these suspicious areas prove to be benign (not cancer). If cancer is found, other x-rays and blood tests are needed. Exactly which tests are helpful depends on the type of cancer, and if and where it has spread. These sections provide a summary of the steps, tests, and types of biopsy that may be suggested.

Doctor Visit and Examination

A woman's first step in having a new breast lump, symptom, or mammogram change evaluated is to meet with her doctor. The doctor will take a medical history, including asking a series of questions about symptoms and factors that may be related to breast cancer risk (such as family history of cancer). The physical examination should include a general examination of the woman's body as well as careful examination of her breasts (called *palpation*). The doctor will examine:

- the breasts, including texture, size, relationship to skin and chest muscles, and the presence of lumps or masses
- the nipples and skin of the breasts
- lymph nodes under the armpit and above the collarbone
- other organs to check for obvious spread of breast cancer and to help evaluate the general condition of the woman's health

Breast Imaging

After completing the physical examination and medical history, the doctor will recommend tests to look at the breast. A mammogram will likely be done first, unless this has already been done or if the woman is very young.

Women with a lump in the breast, other suspicious symptoms, or with a change found on a screening mammogram, will often have a procedure called a *diagnostic mammogram*. A diagnostic mammogram includes more mammogram images of the area of concern to give more information about the size and character of the area. A breast *ultrasound* or *sonogram* also may be done. Ultrasound examination uses high frequency sound waves to further evaluate a lump or mammogram finding. Most importantly, ultrasound helps determine if the area of concern is a fluid-filled simple cyst, which is usually not cancer, or is solid tissue that may be cancer.

Some women may have a breast *magnetic resonance imaging (MRI)* procedure in addition to a diagnostic mammogram and ultrasound. In some cases, breast MRI may help define the size and extent of cancer within the breast tissue. It can also spot other tumors. It may be especially useful in women who have dense breast tissue that makes it more difficult to find tumors with a mammogram.

Breast Biopsy

If a woman or her doctor finds a suspicious breast lump, or if imaging studies show a suspicious area, the woman must have a biopsy. This procedure takes a tissue sample to be examined under the microscope to see if cancer is present.

There are several different types of breast biopsies. Biopsy may be done by a needle, where the doctor removes a piece of breast tissue by placing a needle through the skin into the breast. With a surgical biopsy a surgeon uses a scalpel to cut through the skin and remove a larger piece of breast tissue. Each type of biopsy has advantages and disadvantages. The type of biopsy procedure used is tailored to each woman's situation and the experience of her health care team.

In most cases, a needle biopsy is preferred over a surgical biopsy as the first step in making a cancer diagnosis. A needle biopsy provides a diagnosis quickly and with little discomfort. In addition, it gives the woman a chance to discuss treatment options with her doctor before any surgery is done. In some patients, a surgical biopsy may still be needed to remove all or part of a lump for microscopic examination after a needle biopsy has been done, or it may be necessary to do a surgical biopsy instead of needle biopsy.

Several types of needle biopsies are used to diagnosis breast cancer. The most common is a core needle biopsy that removes a small cylinder of tissue. A suction device attached to the needle can also be used to remove breast tissue. Another type of biopsy is fine needle aspiration biopsy (FNA). FNA uses a smaller needle than a core biopsy and removes a small amount of cells for evaluation under the microscope. FNA also is used to remove fluid from a suspicious cyst.

A doctor can do a core needle or FNA biopsy in the office, without the aid of breast x-rays to guide the needle, if the lump can be felt. If a lump cannot be felt easily, ultrasound or mammograms can be used to guide the

needle during the biopsy. The mammogram-directed technique is called *stereotactic needle biopsy*. In this procedure, a computerized view of the mammogram helps the doctor guide the tip of the needle to the right spot. Ultrasound can be used in the same way to guide the needle. The choice between a mammogram directed stereotactic needle biopsy and ultrasound guided biopsy depends on the type and location of the suspicious area, as well as the experience and preference of the doctor.

Some patients need a surgical (excisional) biopsy. The surgeon generally removes the entire lump or suspicious area and includes a zone of surrounding normal appearing breast tissue called a *margin*. If the tumor cannot be felt, then the mammogram or ultrasound is used to guide the surgeon through a technique called wire localization. After numbing the area with a local anesthetic, x-ray or ultrasound pictures are used to guide a small hollow needle to the abnormal spot in the breast. A thin wire is inserted through the center of the needle, the needle is removed, and the wire is used to guide the surgeon to the right spot.

Most breast biopsies cause little discomfort. Only local anesthesia (numbing of the skin) is necessary for needle biopsies. For surgical biopsies, most surgeons use a local anesthetic plus some intravenous medicines to make the patient drowsy. A general anesthetic is not needed for most breast biopsies.

Tissue examination and pathology report

After a breast biopsy, the biopsy tissue is sent to a pathology lab where a doctor trained to diagnose cancer (pathologist) examines it under the microscope. This process may take

several days. This examination of the breast tissue determines if cancer is present.

The pathology report is a key part of your cancer care. This report tells your doctor what type of cancer you have, and includes many facts that will determine the best treatment for you.

Your doctor should give you your pathology results. You can ask for a copy of your pathology report and to have it explained carefully to you. If you want, you can obtain a second opinion of the pathology of your tissue by having the microscope slides from your tissue sent to a consulting breast pathologist at an NCCN cancer center or other laboratory suggested by your doctor.

Other Tests after Cancer Has Been Diagnosed

If the breast biopsy results show that cancer is present, the doctor may order other tests to find out if the cancer has spread and to help determine treatment. For most women with breast cancer, extensive testing provides no benefit and is not necessary. There is no test that can completely reassure you that the cancer has not spread. The NCCN Guidelines describe which tests are needed based on the extent (spread) of the cancer and the results of the history and physical examination. Tests that may be done include:

Chest x-ray: All women with invasive breast cancer should have a chest x-ray before surgery and to see if there is evidence that the breast cancer has spread to the lungs.

Bone scan: This may provide information about spread of breast cancer to the bone. However, many changes that show up on a bone scan are not cancer. Unless there are

symptoms of spread to the bone, including new pains or changes on blood tests, a bone scan is not recommended except in patients with advanced cancer. To do a bone scan, a small dose of a radioactive substance is injected into your vein. The radioactive substance collects in areas of new bone formation. These areas can be seen on the bone scan image. Other than the needle stick for the injection, a bone scan is painless.

Computerized tomography (CT) scans: CT scans are done when symptoms or other findings suggest that cancer has spread to other organs. For most women with an early stage breast cancer, a CT scan is not needed. But if the cancer appears more advanced, a CT of the abdomen and/or chest may be done to see if the cancer has spread. CT scans take multiple x-rays of the same part of the body from different angles to provide detailed pictures of internal organs. Except for the injection of intravenous dye, necessary for most patients, this is a painless procedure.

Magnetic resonance imaging (MRI): MRI scans use radio waves and magnets to produce detailed images of internal organs without any x-rays. MRI is useful in looking at the brain and spinal cord, and in examining any specific area in the bone. A special MRI procedure called a breast MRI with dedicated breast coils can also be used to look for tumors in the breast. Routine MRIs for all patients with breast cancer are not helpful and not needed.

Positron emission tomography (PET): *PET scans* use a form of sugar (glucose) that contains a radioactive atom. A small amount of the radioactive material is injected into a vein. Then you are put into the PET machine where a special camera can detect the

radioactivity. Because of the high amount of energy that breast cancer cells use, areas of cancer in the body absorb large amounts of the radioactive sugar. Newer devices combine PET scans and CT scans.

Blood Tests: Some blood tests are needed to plan surgery, to screen for evidence of cancer spread, and to plan treatment after surgery. These blood tests include:

- Complete blood count (CBC). This determines whether your blood has the correct type and number of blood cells. Abnormal test results could reveal other health problems including anemia, and could suggest the cancer has spread to the bone marrow. Also, if you receive chemotherapy, doctors repeat this test because chemotherapy often affects the blood-forming cells of the bone marrow.
- Blood chemicals and enzyme tests. These tests are done in patients with invasive breast cancer (not needed with in situ cancer). They can sometimes tell if the cancer has spread to the bone or liver. If these test results are abnormal, your doctor will order imaging tests, such as bone scans or CT scans.

Tumor tests (estrogen receptor, progesterone receptors, and HER-2/neu): Testing the tumor itself for certain features is an important step in deciding what treatment options are best for your particular cancer. The pathology lab tests the cancer tissue that is removed, either from a biopsy or the final surgery.

- Estrogen and Progesterone Receptors: Two *hormones* in women—*estrogen* and *progesterone*—stimulate the growth of normal breast cells and play a role in

many breast cancers. Cancer cells respond to these hormones through the estrogen receptors (ER) and progesterone receptors (PR). ER and PR are cells' "welcome mat" for these hormones circulating in the blood. The tumor is tested for these receptors in a test called a *hormone receptor assay*. If a cancer does not have these receptors, it is referred to as hormone receptor negative (estrogen-receptor negative and progesterone-receptor negative). If the cancer has these receptors, it is referred to as hormone receptor positive (estrogen-receptor positive and/or progesterone-receptor positive) or just ER-positive or PR-positive.

The hormone receptors are important because cancer cells that are ER or PR-positive often stop growing if the woman takes drugs that either block the effect of estrogen and progesterone or decrease the body's levels of estrogen. These drugs lower the chance that the cancer will come back (recur) and improve the chances of living longer. Most women whose breast cancer is ER-positive or PR-positive will take these drugs as part of their treatment. However, these hormone-active drugs are not effective if the cancer does not contain these receptors.

All breast cancers, with the exception of lobular carcinoma in situ, should be tested for hormone receptors. Each woman should ask her doctor for these test results, and if hormone-like drugs or blocking her own hormones should be part of the treatment.

- **HER-2/neu:** About 15-25% of breast cancers have too much of a growth-promoting protein called HER-2/neu and too many copies (more than 2) of the gene that instructs the cells to produce that protein. Tumors with increased levels of HER-2/neu are referred to as “HER-2 positive.”

HER-2 positive tumors tend to grow and spread more rapidly than other breast cancers. They can be treated with a drug called trastuzumab that prevents the HER-2/neu protein from stimulating breast cancer cell growth. Recent studies have shown that trastuzumab given after breast cancer surgery for HER-2 positive tumors reduces the risk of recurrence when the tumor measures larger than 1 cm in diameter or when the cancer has spread to the lymph nodes. Studies also suggest that chemotherapy containing certain drugs (such as doxorubicin or epirubicin) may be especially effective against breast cancers that are HER-2 positive.

Genetic Analysis of Tumor: Treatment decisions today are primarily based on hormone receptor status, HER-2/neu status, appearance of the cancer under the microscope, size of the breast cancer, and extent of spread of the breast cancer. Recently, there has been interest in studying the genes in breast cancers to see if the tumors can be divided into good prognosis and poor prognosis tumors. This information has the potential to identify those patients whose breast cancers have not spread to the lymph nodes and who may not need additional

chemotherapy. At the present time more studies are needed on this new strategy before specific recommendations can be made.

Breast Cancer Grade: Pathologists look at breast cancers under a microscope and determine how much they look like normal breast tissue. This is called the grade of the tumor. Cancers that closely resemble normal breast tissue get a lower number grade and tend to grow and spread more slowly. In general, a lower grade number indicates a cancer that is slightly less likely to spread, and a higher number indicates a cancer that is slightly more likely to spread.

Grade is based on the arrangement of the cells in relation to each other; whether they form tubules, how closely they resemble normal breast cells (nuclear grade), and how many of the cancer cells are in the process of dividing (mitotic count). A low grade (Grade 1) cancer may also be called “well-differentiated” because it more closely resembles normal breast cells. Similarly a high grade tumor (Grade 3) may also be called “poorly differentiated,” since the cells have lost their resemblance to normal breast cells. A moderate grade (Grade 2) cancer is in between low grade and high grade.

The tumor grade is most important in patients with small tumors without lymph node involvement. Patients with well-differentiated tumors may require no further treatment, while patients with moderately or poorly differentiated tumors usually receive additional hormonal therapy or chemotherapy.

Ductal carcinoma in situ (DCIS) is graded in a different way. DCIS is given a nuclear grade, which describes how abnormal the

part of the cancer cells that contain the genetic material appears. Sometimes other features of DCIS are also used by the pathologist to determine the grade.

Breast Cancer Stages

Cancers are divided into different groups, called stages, based on whether the cancer is invasive or non-invasive, the size of the tumor, how many lymph nodes are involved, and whether there is spread to other parts of the body.

Staging a cancer is the process of finding out how far the cancer has progressed when it is diagnosed. Doctors determine the stage of a cancer by gathering information from physical examinations and tests on the tumor, lymph nodes, and distant organs.

A breast cancer's stage is one of the most important factors that may predict prognosis (outlook for cure versus the chance of cancer coming back or spreading to other organs). A cancer's stage, therefore, is an important factor in choosing the best treatment.

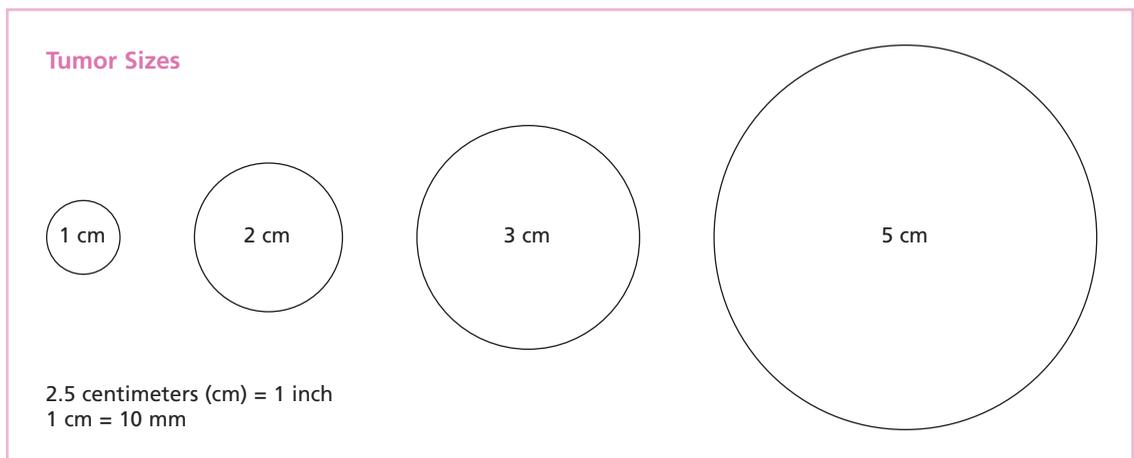
Each woman's outlook with breast cancer differs, depending on the cancer's stage and other factors such as hormone receptors, her general state of health, and her treatment.

You should talk frankly with your doctors about your cancer stage and prognosis, and how they affect treatment options.

System to Define Cancer Stage

The system most often used to describe the extent of breast cancer is the TNM staging system. In TNM staging, information about the tumor (T-Stage), nearby lymph nodes (N-Stage), and distant metastases (M-Stage) is combined and a stage is assigned to specific TNM groupings. The TNM stage groupings are described using Roman numerals from 0 to IV.

The *clinical stage* is determined by what the doctor learns from the physical examination and tests. The *pathologic stage* includes the findings of the pathologist after surgery. Most of the time, pathologic stage is the most important stage since involvement of the lymph nodes can only be accurately determined by examining them under a microscope.



Source: American Cancer Society, 2006

T stands for the size of the cancer (measured in centimeters: 2.5 centimeters = 1 inch) and whether it is growing directly into nearby tissues. **N** stands for spread to nearby lymph nodes and **M** is for metastasis (spread to other parts of the body).

Categories of T, N, and M

T Categories

T categories are based on the size of the breast cancer and whether it has spread to nearby tissue.

Tis: Tis is used only for carcinoma in situ or noninvasive breast cancer such as ductal carcinoma in situ (DCIS) or lobular carcinoma in situ (LCIS).

T1: The cancer is 2 cm in diameter (about $\frac{3}{4}$ inch) or smaller.

T2: The cancer is more than 2 cm but not more than 5 cm in diameter.

T3: The cancer is more than 5 cm in diameter.

T4: The cancer is any size and has spread to the chest wall or the skin.

N Categories

The N category is based on which of the lymph nodes near the breast, if any, are affected by the cancer. There are 2 classifications used to describe N. One is **clinical**—before surgery—i.e. what the doctor can feel or see on imaging studies. The other is **pathological**—what the pathologist can see in lymph nodes removed at surgery.

N0 Clinical: The cancer has not spread to lymph nodes, based on clinical exam.

N0 Pathological: The cancer has not spread to lymph nodes, based on examining them under the microscope.

N1 Clinical: The cancer has spread to lymph nodes under the arm on the same side as the breast cancer. Lymph nodes are not attached to one another or to the surrounding tissue.

N1 Pathological: The cancer is found in 1 to 3 lymph nodes under the arm.

N2 Clinical: The cancer has spread to lymph nodes under the arm on the same side as the breast cancer and are attached to one another or to the surrounding tissue. Or the cancer can be seen to have spread to the *internal mammary lymph nodes* (next to the sternum), but not to the lymph nodes under the arm.

N2 Pathological: The cancer has spread to 4 to 9 lymph nodes under the arm.

N3 Clinical: The cancer has spread to lymph nodes above or just below the collarbone on the same side as the cancer, and may or may not have spread to lymph nodes under the arm. Or the cancer has spread to internal mammary lymph nodes and lymph nodes under the arm, both on the same side as the cancer.

N3 Pathological: The cancer has spread to 10 or more lymph nodes under the arm or also involves lymph nodes in other areas around the breast.

M Categories

The M category depends on whether the cancer has spread to any distant tissues and organs.

M0: No distant cancer spread.

M1: Cancer has spread to distant organs.

Breast Cancer Stages

Overall Stage	T category	N category	M category
Stage 0	Tis	N0	M0
Stage I	T1	N0	M0
Stage IIA	T0	N1	M0
	T1	N1	M0
	T2	N0	M0
Stage IIB	T2	N1	M0
	T3	N0	M0
Stage IIIA	T0	N2	M0
	T1	N2	M0
	T2	N2	M0
	T3	N1	M0
	T3	N2	M0
Stage IIIB	T4	Any N	M0
Stage IIIC	Any T	N3	M0
Stage IV	Any T	Any N	M1

Stage Grouping for Breast Cancer

Once the T, N, and M categories have been assigned, this information is combined to assign an overall stage of 0, I, II, III or IV as seen in the table. The stages identify tumor types that have a similar outlook and thus are treated in a similar way.

Breast Cancer Treatment

Breast cancer treatment includes treatment of the breast and treatment for cancer cells that may have spread to other parts of the body. The breast itself is treated by surgery, often in combination with radiation. The lymph nodes in the armpit are also studied to

see if the breast cancer has spread. The treatment for cancer cells that may have spread beyond the breast and lymph nodes in the armpit is a combination of either hormone therapy and/or chemotherapy.

Treatment of the Breast

Most women with breast cancer will have surgery. The 2 common types of surgery are breast-conserving surgery and mastectomy.

Breast-Conserving Surgery

Lumpectomy removes only the breast lump and a rim of normal surrounding breast tissue. *Partial* or *segmental mastectomy* or *quadrantectomy* removes more breast tissue than a lumpectomy (up to one-quarter of the breast).

If cancer cells are present at the outside edge of the removed breast tissue (the margin), more surgery is usually needed to remove any remaining cancer. Most often this additional surgery is a repeat lumpectomy, but sometimes it requires removal of the entire breast (*mastectomy*).

Radiation therapy is usually given after these types of surgery. Side effects of these operations include temporary swelling and tenderness and hardness due to scar tissue that forms in the surgical site.

For most women with stage I or II breast cancer, *breast conservation therapy* (lumpectomy and radiation therapy) is as effective as mastectomy. Survival rates of women treated with these 2 approaches are the same. However, breast conservation therapy is not an option for all women with breast cancer (see section, “Choosing Between Breast-Conserving Surgery and Mastectomy” on page 18.) Those who may *not* have breast-conserving therapy include:

- prior radiation therapy of the affected breast or chest
- suspicious or malignant appearing abnormalities that are widespread throughout the breast
- women whose lumpectomy, including any possible repeat lumpectomy when needed, cannot completely remove their cancer with a satisfactory cosmetic result
- women with active connective tissue disease involving the skin (especially scleroderma or lupus) that makes body tissues especially sensitive to the side effects of radiation
- pregnant women who would require radiation while still pregnant

- women whose tumors are larger than 5 centimeters (2 inches) and can't be shrunk by treatment before surgery

Radiation therapy as a part of breast-conserving therapy for invasive cancer can sometimes be omitted. Women who may consider lumpectomy without radiation therapy have all of the following:

- age 70 years or older; and
- a tumor 2 cm or less that has been completely removed; and
- a tumor that contains hormone receptors; and
- no lymph node involvement; and
- who receive treatment with hormone therapy

Mastectomy

Mastectomy is removal of the entire breast, including the nipple. Mastectomy is needed for some cases, and some women choose mastectomy rather than lumpectomy. (See discussion on next page, Choosing Between Breast-Conserving Surgery and Mastectomy.)

Different words are used to describe mastectomy depending on the extent of the surgery in the armpit and the muscles under the breast. In a simple or total mastectomy the entire breast is removed, but no lymph nodes from under the arm or muscle tissue from beneath the breast is removed. In a modified radical mastectomy, the entire breast and some axillary (underarm) lymph nodes are removed. In a radical mastectomy, all the muscle under the breast is also removed. Radical mastectomy is rarely used today, and for most women, this surgery is not more effective than more limited forms of mastectomy.

Choosing Between Breast-Conserving Surgery and Mastectomy

The advantage of breast-conserving surgery (lumpectomy) is that it preserves the appearance of the breast. A disadvantage is the need for several weeks of radiation therapy after surgery. Some women who have a mastectomy will still need radiation therapy. Women who choose lumpectomy and radiation can expect the same chance of survival as those who choose mastectomy.

Although most women and their doctors prefer lumpectomy and radiation therapy, your choice will depend on a number of factors, such as:

- how you feel about losing your breast
- whether you want to devote the additional time and travel for radiation therapy
- whether you would want to have more surgery to reconstruct your breast after having a mastectomy
- your preference for mastectomy as a way to “take it all out as quickly as possible”

In determining the preference for lumpectomy or mastectomy, be sure to get all the facts. Though you may have a gut feeling for mastectomy to “take it all out as quickly as possible,” the fact is that in most cases doing so does not provide any better chance of long term control or a better outcome of treatment. Large research studies with thousands of women participating, and over 20 years of information show that when lumpectomy can be done, mastectomy does not provide any better chance of survival from breast cancer than lumpectomy plus radiation. It is because of these facts that most women do not have their breast removed.

Reconstructive Surgery

If a woman has a mastectomy, she may want to consider having the breast rebuilt; this is called *breast reconstruction*. This requires additional surgery to create the appearance of a breast after mastectomy. The breast can be reconstructed at the same time the mastectomy is done (immediate reconstruction) or at a later date (delayed reconstruction). Surgeons may use saline-filled implants or tissue from other parts of your body.

How do a woman and her doctor decide on the type of reconstruction and when she should have the procedure? The answer depends on the woman’s personal preferences, the size and shape of her breasts, the size and shape of her body, her level of physical exercise, details of her medical situation (such as how much skin is removed), and if she needs chemotherapy or radiation.

If you are thinking about breast reconstruction, please discuss this with your doctor when you are planning your treatment.

Lymph Node Surgery

In the treatment of invasive cancer, whether a woman has a mastectomy or lumpectomy, she and her doctor usually need to know if the cancer has spread to the lymph nodes. When the lymph nodes are affected, there is an increased likelihood that cancer cells have spread through the bloodstream to other parts of the body.

Doctors once believed that removing as many lymph nodes as possible would reduce the risk of developing spread of breast cancer and improve a woman’s chances for long-term survival. We now know that removing the lymph nodes probably does not improve the

chance for long-term survival. But knowing whether lymph nodes are involved is important in selecting the best treatment to prevent cancer recurrence.

The only way to accurately determine if lymph nodes are involved is to remove and examine them under the microscope. This means removing some or all of the lymph nodes in the armpit. In the standard operation, called an *axillary lymph node dissection*, all the lymph nodes are removed. This is often necessary. In many cases, lymph node testing may be done with a more limited surgery that only removes a few lymph nodes with fewer side effects. This is called *sentinel lymph node biopsy*, and is discussed further below.

For some women with invasive cancer, removing the underarm lymph nodes can be considered optional. This includes:

- women with tumors so small and with such a favorable outlook that lymph node spread is unlikely
- instances where it would not affect whether *adjuvant* treatment is given
- elderly women
- women with serious medical conditions

Lymph node surgery is not necessary with pure ductal carcinoma in situ or pure lobular carcinoma in situ. A sentinel node biopsy (see below) may be done if the woman is having surgery (such as mastectomy) that would make it impossible to do the sentinel node biopsy procedure if invasive cancer were found in the tissue removed during the surgery.

The surgical technique used to remove lymph nodes from under the armpit depends on the personal circumstances of the patient.

If there are enlarged lymph nodes with apparent spread of the cancer, or the lymph nodes are otherwise found to be involved with cancer, then complete axillary lymph dissection is necessary. However, in many cases, the lymph nodes are not enlarged and are not likely to contain cancer. In such cases, the more limited sentinel lymph node biopsy procedure can be performed.

In the sentinel lymph node biopsy procedure the surgeon finds and removes the “sentinel nodes,” the first few lymph nodes into which a tumor drains. These are the lymph nodes most likely to contain cancer cells. To find these so-called “sentinel lymph nodes,” the surgeon injects a radioactive substance and/or a blue dye under the nipple or into the area around the tumor. Lymphatic vessels carry these substances into the sentinel lymph nodes and provide the doctor with a “lymph node map.” The doctor can either see the blue dye or detect the radioactivity with a Geiger counter. The surgeon then removes the marked nodes for examination by the pathologist.

If the sentinel node contains cancer, the surgeon removes more lymph nodes in the armpit (*axillary dissection*). This may be done at the same time or several days after the original sentinel node biopsy. If the sentinel node is cancer-free, the patient will not need more lymph node surgery and can avoid the side effects of full lymph node surgery. This limited sampling of lymph nodes is not appropriate for some women. A sentinel lymph node biopsy should be considered only if there is a team experienced with this technique.

Side Effects of Lymph Node Surgery

Side effects of lymph node surgery can be bothersome to many women. The side effects can occur with either the full axillary lymph node dissection or sentinel lymph node biopsy. Side effects are much less common and less severe with the sentinel lymph node procedure.

Side effects of lymph node surgery include:

- temporary or permanent numbness in the skin on the inside of the upper arm
- temporary limitation of arm and shoulder movements
- swelling of the breast and arm called *lymphedema*

Lymphedema is the most significant of these side effects. If it develops it may be permanent. Most women who develop lymphedema find it bothersome but not disabling. No one can predict which patients will develop this condition or when it will develop. Lymphedema can develop just after surgery, or even months or years later. Significant lymphedema occurs in about 10% of women who have axillary lymph node dissection and in up to 5% of women who have sentinel lymph node biopsy.

With care, patients can take steps to help avoid lymphedema or at least keep it under control. Talk to your doctor for more details.

Some of the steps to take to help avoid lymphedema include:

- Avoid having blood drawn from or IVs inserted into the arm on the side of the lymph node surgery.
- Do not allow a blood pressure cuff to be placed on that arm. If you are in the hospital, tell all health care workers about your arm.

- If your arm or hand feels tight or swollen, don't ignore it. Tell your doctor immediately.
- If needed, wear a well-fitted compression sleeve.
- Wear gloves when gardening or doing other things that are likely to lead to cuts.

For more information on lymphedema, call the American Cancer Society at 1-800-ACS-2345 and ask for *Lymphedema: What Every Women With Breast Cancer Should Know*.

Radiation Therapy

Radiation therapy uses a beam of high-energy rays (or particles) to destroy cancer cells left behind in the breast, chest wall, or lymph nodes after surgery. Radiation may also be needed after mastectomy in cases with either a larger breast tumor, or when cancer is found in the lymph nodes.

This type of treatment can be given in several ways.

- External beam radiation delivers radiation from a machine outside the body. This is the typical radiation therapy given after lumpectomy and is given to the entire breast with an extra dose (“boost”) to the site of the tumor. It is usually given 5 days a week for a course of 6 to 7 weeks.
- Brachytherapy, also called internal radiation or interstitial radiation, describes the placement of radioactive materials in or near where the tumor was removed. They may be placed in the lumpectomy site to “boost” the radiation dose in addition to external beam radiation therapy.

Recently there has been interest in limiting radiation therapy only to the site of the lumpectomy, referred to as partial breast irradiation. This is based on the observation that when breast cancer recurs in the breast, the most common place is in the site of the original tumor. Brachytherapy is one technique of partial breast irradiation. External beam radiation therapy also can be used to deliver partial breast irradiation.

The extent of radiation depends on whether or not a lumpectomy or mastectomy was done and whether or not lymph nodes are involved. If a lumpectomy was done, the entire breast receives radiation with an extra boost of radiation to the area in the breast where the cancer was removed to prevent it from coming back in that area.

If the surgery was mastectomy, radiation is given to the entire area of the skin and muscle where the mastectomy was done if the tumor was over 5 cm in size, or if the tumor is close to the edge of the removed mastectomy tissue.

In patients who have had lumpectomy or mastectomy, further radiation may be recommended if the cancer has spread to the lymph nodes. Radiation may be given to the area just above the collarbone and along the breastbone, depending on the number and location of involved lymph nodes.

Side effects most likely to occur from radiation include swelling and heaviness in the breast, sunburn-like skin changes in the treated area, and fatigue. Changes to the breast tissue and skin usually go away in 6 to 12 months. In some women, the breast becomes smaller and firmer after radiation therapy. There may also be some aching in the breast, and rarely

a rib fracture or second cancer may be caused by the radiation.

Systemic Treatment

To reach cancer cells that may have spread beyond the breast and nearby tissues, doctors use drugs that can be given by pills or by injection. This type of treatment is called *systemic therapy*. Examples of systemic treatment include chemotherapy, hormone therapy, and *monoclonal antibody therapy*. Hormone therapy is only helpful if the tumor is hormone receptor positive, and trastuzumab (the monoclonal antibody therapy) is only effective if the tumor is HER-2 positive.

Even in the early stages of the disease, cancer cells can break away from the breast and spread through the bloodstream. These cells usually don't cause symptoms, they don't show up on an x-ray, and they can't be felt during a physical examination. But if they are allowed to grow, they can establish new tumors in other places in the body. Systemic treatment given to patients who have no evidence of spread of cancer, but who are at risk of developing spread of the cancer is called *adjuvant therapy*. The goal of adjuvant therapy is to kill undetected cancer cells that have traveled from the breast.

Women who have invasive breast cancer should receive adjuvant therapy, except those with very small or well-differentiated tumors. For example, women with hormone receptor positive disease will receive hormone therapy, and women with HER-2 positive tumors greater than 1 cm in diameter or with involvement of lymph nodes will receive monoclonal antibody therapy with trastuzumab. Chemotherapy may also be recommended based on the size of

the tumor, grade of the tumor, and presence or absence of lymph node involvement. For women with breast cancers with hormone receptor negative tumors, hormone therapy is not effective and in women with HER-2 negative tumors, trastuzumab is not effective. In women with tumors that are hormone and HER-2 negative, the only decision is whether or not to receive chemotherapy.

In most cases, systemic treatment is given soon after surgery using the results of the surgery and pathology evaluation to determine the best choice treatment. In some cases, the systemic therapy is given to patients after a needle biopsy but before lumpectomy or mastectomy. This is called *neoadjuvant treatment*. Oncologists give patients neoadjuvant treatment to try to shrink the tumor enough to make surgical removal easier. This may allow women who would otherwise need mastectomy to have breast-conserving surgery.

For women whose breast cancer has spread to other organs in the body (metastases), systemic treatment is the main treatment. This treatment may be chemotherapy, hormone therapy, trastuzumab, or combined therapy.

Chemotherapy

Chemotherapy uses medicines that are toxic to cancer cells and that often kill the cancer cells. Usually these cancer-fighting drugs are given intravenously (injected into a vein) or as a pill by mouth. Either way, the drugs travel through the bloodstream to the entire body. Doctors who prescribe these drugs (medical oncologists) sometimes use only a single drug and other times use a combination of drugs.

When chemotherapy is given after surgery for early stage breast cancer, it is called adjuvant chemotherapy. Sometimes chemotherapy is given before surgery. This is called neoadjuvant chemotherapy. In most cases, adjuvant or neoadjuvant chemotherapy is most effective when combinations of drugs are used together. Chemotherapy may also be given to treat breast cancer that has spread to places other than the breast or lymph nodes. Both single drugs and combinations of drugs are often used in the treatment of breast cancer that has spread. Clinical research studies over the last 30 years have determined which chemotherapy drugs are most effective. With continued research, better combinations may be discovered.

Below are listed common combinations of adjuvant chemotherapy drugs, divided into combinations for women with HER-2 positive tumors and HER-2 negative tumors. There are also lists of common chemotherapy options for women who have recurrent or metastatic breast cancer.

Chemotherapy Drugs Commonly Used to Treat Breast Cancer

Brand Name	Generic Name
Adriamycin	Doxorubicin
Cytosan	Cyclophosphamide
Ellence	Epirubicin
Navelbine	Vinorelbine
Taxol	Paclitaxel
Taxotere	Docetaxel
Xeloda	Capecitabine
Gemzar	Gemcitabine

Adjuvant Chemotherapy Options

ADJUVANT CHEMOTHERAPY OPTIONS FOR HER-2 NEGATIVE TUMORS

FAC/CAF	fluorouracil/doxorubicin/cyclophosphamide or
FEC/CEF	cyclophosphamide/epirubicin/fluorouracil
AC	doxorubicin/cyclophosphamide with or without paclitaxel
EC	epirubicin/cyclophosphamide
TAC	docetaxel/doxorubicin/cyclophosphamide with filgrastim support
A→CMF	doxorubicin followed by cyclophosphamide/methotrexate/fluorouracil
E→CMF	epirubicin followed by cyclophosphamide/methotrexate/fluorouracil
CMF	cyclophosphamide/methotrexate/fluorouracil
AC x 4	doxorubicin/cyclophosphamide followed by sequential paclitaxel x 4, every 2 week regimen with filgrastim support
A→T→C	doxorubicin followed by paclitaxel followed by cyclophosphamide, every 2 week regimen with filgrastim support
FEC→T	fluorouracil/epirubicin/cyclophosphamide followed by docetaxel

ADJUVANT CHEMOTHERAPY OPTIONS FOR HER-2 POSITIVE TUMORS

Adjuvant:

AC→T + Trastuzumab	doxorubicin/cyclophosphamide followed by paclitaxel with trastuzumab
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Neoadjuvant:

T + Trastuzumab→	paclitaxel plus trastuzumab followed by
CEF + Trastuzumab	cyclophosphamide/epirubicin/fluorouracil plus trastuzumab

Doctors give chemotherapy in cycles, with each period of treatment followed by a rest period. The chemotherapy is given on the first day of each cycle, and then the body is given time to recover from the effects of chemotherapy. The chemotherapy drugs are then repeated to start the next cycle. The time between giving the chemotherapy drugs varies according to the specific chemotherapy drug

or combination of drugs. Adjuvant chemotherapy usually lasts for a total time of 3 to 6 months depending on the drugs used.

The side effects of chemotherapy depend on the type of drugs used, the amount taken, and the length of treatment. Some women have many side effects while other women have few side effects.

Chemotherapy Regimens for Recurrent or Metastatic Breast Cancer

PREFERRED SINGLE AGENTS

- Doxorubicin
- Epirubicin
- Pegylated liposomal doxorubicin
- Paclitaxel
- Docetaxel
- Capecitabine
- Vinorelbine
- Gemcitabine
- Albumin-bound paclitaxel

PREFERRED COMBINATIONS

- CAF/FAC (cyclophosphamide/doxorubicin/fluorouracil)
- FEC (fluorouracil/epirubicin/cyclophosphamide)
- AC (doxorubicin/cyclophosphamide)
- EC (epirubicin/cyclophosphamide)
- AT (doxorubicin/docetaxel; doxorubicin/paclitaxel)
- CMF (cyclophosphamide/methotrexate/fluorouracil)
- Docetaxel/capecitabine
- GT (gemcitabine/paclitaxel)

PREFERRED AGENTS WITH BEVACIZUMAB

Paclitaxel

OTHER ACTIVE AGENTS

- Cisplatin
- Carboplatin
- Etoposide (in pill form)
- Vinblastine
- Fluorouracil continuous IV infusion

- Doxorubicin and epirubicin may cause heart damage but this is uncommon in people who do not have a history of heart disease. If you know you have heart disease or there is concern you might have heart disease, your doctor may suggest special heart tests before you use these drugs and may suggest other chemotherapy drugs if your heart function is weakened.
 - Temporary side effects often include loss of appetite, nausea and vomiting, fatigue, mouth sores, and hair loss.
 - Chemotherapy may cause menstrual cycles to stop either temporarily or permanently.
 - Lowering of the blood counts from chemotherapy is the most common serious side effect of chemotherapy. Chemotherapy does this by damaging the blood producing cells of the bone marrow. A drop in white blood cells can raise a patient's risk of infection; a shortage of blood platelets can cause bleeding or bruising after minor cuts or injuries; and a decline in red blood cells can lead to fatigue.
- There are treatments for these side effects. There are excellent drugs that prevent or at least reduce nausea and vomiting. A group of drugs called growth factors that stimulate the production of white blood cells or red

Preferred Chemotherapy Regimens in Combination with Trastuzumab (for HER-2 positive metastatic disease)

- Paclitaxel with or without carboplatin
- Docetaxel with or without carboplatin
- Vinorelbine

blood cells can help bone marrow recover after chemotherapy and prevent problems resulting from low blood counts. Although these drugs are often not necessary, doctors have been using them to allow them to give the chemotherapy more often. Talk with your doctor about which treatment will be right for you.

Premenopausal women will often develop early *menopause* and infertility from chemotherapy drugs. The older a woman is when she receives chemotherapy, the more likely it is she will stop menstruating or lose her ability to become pregnant. Some chemotherapies are more likely to do this than others. However, you cannot depend on chemotherapy to prevent pregnancy, and getting pregnant while receiving chemotherapy could lead to birth defects and interfere with treatment. Therefore, premenopausal women should consider using birth control while receiving chemotherapy. It is safe to have children after chemotherapy, but it's not safe to get pregnant while on treatment.

Ask your doctor or call the American Cancer Society and ask for a copy of specific guidelines for treating many of the side effects caused by chemotherapy, such as *Nausea and Vomiting Treatment Guidelines for Patients With Cancer* and *Fever and Neutropenia Treatment Guidelines for Patients With Cancer*.

Monoclonal Antibody Therapy

Trastuzumab (Herceptin) is an antibody directed against the HER-2/neu receptor that is on the surface of the breast cancer cells of some patients. Trastuzumab is an important treatment option for some patients with HER-2 positive tumors. It may be used as adjuvant therapy with chemotherapy to reduce the risk of recurrence, as neoadjuvant therapy combined with chemotherapy to shrink the size of the tumor before surgery, and as treatment for metastatic breast cancer. Trastuzumab can cause heart damage and should be used cautiously when combined with other heart damaging drugs such as doxorubicin and epirubicin.

Bevacizumab (Avastin) is another monoclonal antibody that may be used in patients with metastatic breast cancer. It is used in combination with the chemotherapy drug paclitaxel. Bevacizumab works by preventing the growth of new blood vessels that supply tumor cells with the blood, oxygen, and other nutrients they need to grow.

Hormone Therapy

Estrogen, a hormone produced mostly by the *ovaries*, but also from hormones produced by the adrenal glands and fat tissue in a woman's body, causes some breast cancers to grow.

Several approaches can be used to block the effect of estrogen or to lower estrogen levels. These approaches can be divided into two main groups:

- Drugs that block the effect of estrogen on cancer cells, called anti-estrogens. These medicines do not decrease estrogen levels; instead, they prevent estrogen from causing the breast cancer cells to grow.
- Drugs or treatments that lower the production of estrogen in the body.

These treatments are used in two situations:

- Women who have hormone receptor positive breast cancers that appear to have been completely removed by surgery. This adjuvant therapy reduces the risk of recurrence or spread. Adjuvant therapy may also include chemotherapy or trastuzumab.
- Women with hormone receptor positive breast cancer that has spread to other parts of the body or in whom the cancer comes back.

Hormone drugs are only effective in women whose cancer contains increased levels of estrogen or progesterone receptor. Every breast cancer should be tested for these receptors, and you should ask your doctor the results of this test on your cancer. If the cancer is negative for both these receptors, then the hormone drugs are of no benefit.

Often a combination of hormone therapy and chemotherapy are used in the treatment of breast cancer.

Anti-Estrogen Drugs

Tamoxifen is the *antiestrogen* drug used most often. Taking tamoxifen as adjuvant therapy after surgery, usually for 5 years, reduces the chance of hormone receptor positive breast cancer coming back. Tamoxifen is also used to treat metastatic breast cancer.

In many women, tamoxifen causes the symptoms of menopause, including hot flashes, vaginal discharge, and mood swings. Tamoxifen has two rare, but more serious side effects. These are a slightly increased risk of developing cancer of the lining of the uterus (endometrial cancer) and uterine sarcoma, and a slightly increased risk of developing blood clots. For most women with breast cancer, the benefits of taking the drug far outweigh the risks.

Toremifene is another antiestrogen closely related to tamoxifen. It may be an option for postmenopausal women with metastatic breast cancer.

Fulvestrant is a newer drug that reduces the number of estrogen receptors. It is often effective in postmenopausal women, even if the breast cancer is no longer responding to tamoxifen. Hot flashes, mild nausea and fatigue are the major side effects of fulvestrant.

Drugs that Lower Estrogen Levels – Aromatase Inhibitors

Aromatase inhibitors stop estrogen production in postmenopausal women. Three drugs in this category have been approved for treatment of breast cancer, anastrozole, letrozole, and exemestane. They work by blocking an enzyme that makes estrogen in postmenopausal women. They cannot stop the ovaries of premenopausal women from

making estrogen. For this reason they are only effective in postmenopausal women. For premenopausal women, tamoxifen remains the best drug to use.

The aromatase inhibitors have been compared with tamoxifen as adjuvant hormone therapy. They have fewer side effects than tamoxifen because they don't cause cancer of the uterus and very rarely cause blood clots. They can, however, cause osteoporosis and bone fractures because they remove all estrogen from a postmenopausal woman. They also cause side effects of hot flashes and sometimes joint pain.

The aromatase inhibitors are more effective than tamoxifen alone in preventing breast cancer from coming back in postmenopausal women. Based on recent studies, many doctors recommend including an aromatase inhibitor in the adjuvant hormone therapy in postmenopausal women with hormone receptor positive breast cancer.

Hormone Therapy and Menopause

As discussed above, the aromatase inhibitors are not recommended for premenopausal women. Therefore, determining whether the patient is menopausal is important in making treatment decisions. This is not as simple as it may sound, because menstrual periods can stop as a side effect of treatment while the ovaries continue to make estrogen. Also, sometimes chemotherapy stops the ovaries from making estrogen for a short period of time, but when the ovaries recover from the chemotherapy they start making estrogen again. Therefore, if the use of an aromatase inhibitor is considered in young women, monitoring of hormone levels such as estradiol

and FSH may be required to make sure that a woman is truly postmenopausal.

Ovarian Ablation

The ovaries are the source of most estrogen in premenopausal women. Destroying the ability of the ovaries to produce estrogen (ablation) may be an effective hormone therapy to treat premenopausal women with cancers that are positive for the estrogen or progesterone receptors. Destruction of the ovary production of estrogen can be done in a number of ways:

- The ovaries can be removed by surgery (*oophorectomy*).
- Radiation therapy can be given to the ovaries.
- Drugs called *luteinizing hormone-releasing hormone (LHRH) agonists or antagonists* block estrogen production by the ovaries.

Bisphosphonates

Bisphosphonates are used in breast cancer treatment to strengthen bones that have been weakened by invading breast cancer cells. The most commonly used bisphosphonates in breast cancer treatment are pamidronate and zoledronate. These drugs are not used unless cancer has spread to the bone.

Hormonal treatment with the aromatase inhibitors may also weaken the bones by causing loss of calcium from the bone (called osteoporosis) and thus increase the risk of a fracture. Therefore, patients treated with an aromatase inhibitor should have their bone strength tested (called a bone density test) to determine if medication to strengthen their bones would be appropriate. Some patients

may go into early menopause due to the side effects of chemotherapy. Menopause is associated with bone loss, too. These patients may also undergo a bone density test to evaluate the presence of osteoporosis. There are a number of medications, including some oral forms of bisphosphonates, to treat the loss of calcium from bone that is not caused by direct breast cancer in the bone. Talk with your doctor about whether one of these medications is right for you.

Treatment of Breast Cancer During Pregnancy

Breast cancer is diagnosed in about 1 pregnant woman out of 3,000. Radiation therapy during pregnancy is known to increase the risk of birth defects, so it is not recommended for pregnant women with breast cancer.

For this reason, breast conservation therapy (lumpectomy and radiation therapy) is not considered an option if radiation cannot be delayed until it is safe to deliver the baby. However, breast biopsy procedures and even modified radical mastectomy are safe for the mother and fetus.

Treatment of Pain and Other Symptoms

Most of this booklet discusses ways to remove or destroy breast cancer cells or to slow their growth. But helping you feel as well as you can and continuing to do the things you enjoy doing are important goals. Don't hesitate to discuss your symptoms or how you feel with

your cancer care team. There are effective and safe ways to treat pain, other symptoms of breast cancer, and most of the side effects caused by breast cancer treatment. If you don't tell your health care team, they may have no way of knowing about your problems.

Complementary and Alternative Therapies

Complementary and alternative medicines are a group of different types of health care practices, systems, and products that are not part of your usual medical treatment. They may include herbs, special supplements, acupuncture, massage, and a host of other types of treatment. You may hear about different treatments from your family and friends. People will offer all sorts of things, such as vitamins, herbs, stress reduction, and more as a treatment for your cancer or to help you feel better.

The American Cancer Society defines complementary medicine or methods as those that are used in addition to your regular medical care. If these treatments are carefully managed, they may add to your comfort and well-being. Alternative medicines are defined as those that are used instead of your regular medical care. Some of them have been proven harmful, but are still promoted as "cures." If you choose to use these alternatives, they may reduce your chance of fighting your cancer by delaying or replacing regular cancer treatment.

There is a great deal of interest today in complementary and alternative treatments for cancer. Many are being studied to find out if they are truly helpful to people with cancer.

Before changing your treatment or adding any of these methods, it is best to discuss this openly with your doctor or nurse. Some methods can be safely used along with standard medical treatment. Others, however, can interfere with standard treatment or cause serious side effects. That is why it's important to talk with your doctor. More information about complementary and alternative methods of cancer treatment is available through the American Cancer Society's toll-free number at 1-800-ACS-2345 or on our Web site at www.cancer.org.

Other Things to Consider During and After Treatment

During and after your treatment for breast cancer you may be able to speed up your recovery and improve your quality of life by taking an active role in your care. Learn about the benefits and risks of each of your treatment options, and ask questions of your cancer care team if there is anything you do not understand. Learn about and look out for side effects of treatment, and report these right away to your cancer care team so they can take steps to ease them.

Remember that your body is as unique as your personality and your fingerprints. Although understanding your cancer's stage and learning about your treatment options can help predict what health problems you may face, no one can say for sure how you will respond to cancer or its treatment.

You may have special strengths such as a history of excellent nutrition and physical activity, a strong family support system, or a

deep faith, and these strengths may make a difference in how you respond to cancer treatment. There are also experienced professionals in mental health services, social work services, and pastoral services who may assist you in coping with your illness.

You can also help in your own recovery from cancer by making healthy lifestyle choices. If you use tobacco, stop now. Quitting will improve your overall health and the full return of the sense of smell may help you enjoy a healthy diet during recovery. If you use alcohol, limit how much you drink. Have no more than 1 drink per day. Good nutrition can help you get better after treatment. Eat a nutritious and balanced diet, with plenty of fruits, vegetables, and whole grain foods.

If you are being treated for cancer, be aware of the battle that is going on in your body. Radiation therapy and chemotherapy add to the fatigue caused by the disease itself. To help you with the fatigue, plan your daily activities around when you feel your best. Get plenty of sleep at night. And ask your cancer care team about a daily exercise program to help you feel better.

A woman's choice of treatment will likely be influenced by her age, the image she has of herself and her body, her hopes and fears, and her stage in life. For example, many women select breast-conserving surgery with radiation therapy over a mastectomy for body image reasons. On the other hand, some women who choose mastectomy may want the affected area removed, regardless of the effect on their body image, and others may be more concerned about the side effects of radiation therapy than body image.

Other issues that concern women include loss of hair from chemotherapy and the changes of the breast from radiation therapy. Women on chemotherapy tend to gain weight and it is important to continue to eat a healthy diet and exercise as much as your energy level will permit. In addition to these body changes, women may also be concerned about the outcome of their treatment. These are all factors that affect how a woman will make decisions about her treatment, how she views herself, and how she feels about her treatment.

Concerns about sexuality are often very worrisome to a woman with breast cancer. Some treatments for breast cancer can change a woman's hormone levels and may have a negative impact on sexual interest and/or response. A diagnosis of breast cancer when a woman is in her 20s or 30s is especially difficult because choosing a partner and childbearing are often very important during this period. Relationship issues are also important because the diagnosis can be very distressing for the partner, as well as the patient. Partners are usually concerned about how to express their love physically and emotionally during and after treatment.

Suggestions that may help a woman adjust to changes in her body image include looking at and touching her body; seeking the support of others, preferably before surgery; involving her partner as soon as possible after surgery; and openly talking about the feelings, needs, and wants created by her changed image.

A cancer diagnosis and its treatment is a major life challenge, with an impact on you and everyone who cares for you. Before you

get to the point where you feel overwhelmed, consider attending a meeting of a local support group. If you need help in other ways, contact your hospital's social service department or call the American Cancer Society who can help you find resources in your area. We are available anytime day or night at 1-800-ACS-2345.

Clinical Trials

The Purpose of Clinical Trials

Studies of promising new or experimental treatments in patients are known as clinical trials. Researchers conduct studies of new treatments to answer the following questions:

- Is the treatment helpful?
- How does this new type of treatment work?
- Does it work better than other treatment already available?
- What side effects does the treatment cause?
- Are the side effects greater or less than the standard treatment?
- Do the benefits outweigh the side effects?
- In which patients is the treatment most likely to be helpful?

Types of Clinical Trials

A new treatment is normally studied in three phase of clinical trials.

Phase I Clinical Trials

The purpose of a phase I study is to find the best way to give a new treatment and how much of it can be given safely. Doctors watch patients carefully for any harmful side effects. The treatment has been well-tested in labo-

ratory and animal studies, but the side effects in patients are not completely known. Although doctors are hoping to help patients, the main purpose of a phase I study is to test the safety of the drug.

Phase II Clinical Trials

These are designed to see if the drug works. Patients are usually given the highest dose that doesn't cause severe side effects (determined from the phase I study) and closely observed for an effect on the cancer. The doctor will also look for side effects.

Phase III Clinical Trials

Phase III studies involve large numbers of patients. Some phase III clinical trials may enroll thousands of patients and are designed to compare the results of the group given the new or experimental treatment with the group that is given the standard treatment. Patients are randomly assigned to one of the two groups, which means that the patient and the doctor will not know before the study starts which treatment will be given. One group (the control group) will receive the standard (most accepted) treatment. The other group will receive the new treatment. Phase III studies are done when researchers believe that the two treatments are effective, but that the experimental treatment may offer some advantages. This cannot be proven until the results of the two groups are compared with each other. The study will be stopped if the side effects of the new treatment are too severe or if one group has had much better results than the others.

All patients in a clinical trial are closely watched by a team of experts to monitor

their progress very carefully. The study is especially designed to pay close attention to participating patients. However, there are some risks. While most side effects will disappear in time, some can be permanent or even life threatening. Keep in mind, though, that even standard treatment have side effects. Depending on many factors, you may decide to enroll in a clinical trial

Deciding to Enter a Clinical Trial

Enrollment in a clinical trial is completely up to you. Your doctors and nurses will explain the risks and possible benefits of the study to you in detail and will give you a form to read and sign indicating your understanding of the study and your desire to take part. You should read the consent form very carefully and be certain that all of your questions about the clinical trial are answered before you sign it. Even after signing the form and after the clinical trial begins, you are free to leave the study at any time, for any reason. Taking part in the study will not prevent you from getting other medical care you may need.

To find out more about clinical trials, ask your cancer care team. Among the questions you should ask are:

- What is the purpose of the study?
- What kinds of tests and treatments does the study involve?
- What does this treatment do?
- What is likely to happen in my case with or without this new research treatment?
- What are my choices and their advantages and disadvantages?
- How could the study affect my daily life?

Work-Up (Evaluation) and Treatment Guidelines

Decision Trees

The decision trees on the following pages represent different stages of breast cancer. Each one shows you step-by-step how you and your doctor can arrive at the choices you need to make about your treatment.

Keep in mind, this information is not meant to be used without the expertise of your own doctor who is familiar with your situation, medical history, and personal preferences.

Participating in a clinical trial is an option for women at any stage of breast cancer. Taking part in a study does not prevent you from getting other medical care you may need.

The NCCN guidelines are updated as new, significant data become available. To ensure you have the most recent version, consult the Web sites of the American Cancer Society (www.cancer.org) or NCCN (www.nccn.org). You may also call the NCCN at 1-888-909-NCCN or the ACS at 1-800-ACS-2345 for the most recent information on these guidelines. If you have questions about your cancer or cancer treatment, please call the American Cancer Society anytime day or night at 1-800-ACS-2345.

Stage

Work-Up (Evaluation)

Treatment

Stage 0Lobular carcinoma
in situ (LCIS)

- Medical history and physical exam
- Diagnostic mammogram (both breasts)
- Pathology review of biopsy sample

Observation

Stage 0 Lobular Carcinoma in Situ

The work up for lobular carcinoma in situ (LCIS) includes a complete medical history and physical examination. A diagnostic mammogram of both breasts is done to see if there are any other abnormal areas in either breast. Pathology review (another pathologist to look at the biopsy sample) is suggested to be certain you have LCIS and not an invasive cancer or another condition.

LCIS is usually not treated with surgery other than the initial biopsy procedure. Observation (careful follow-up without mastectomy) is the preferred option for most

women who are diagnosed with LCIS because LCIS is not an invasive cancer, nor does it normally become one. But women with LCIS have an increased risk of developing invasive breast cancer in either breast. Ways to reduce the risk of breast cancer have become an important option.

There is evidence that two drugs—raloxifene and tamoxifen—can lower the risk of developing a future invasive breast cancer in women diagnosed with LCIS. This risk is lowered when the drug is taken for a full 5 years.

A preventive mastectomy of both breasts may be an option for women with LCIS who

Stage 0 Lobular Carcinoma in Situ

Risk Reduction

Consider taking tamoxifen for 5 years
In special circumstances, double mastectomy, with or without breast reconstruction is an option.

Follow-Up

- Medical history and physical exam every 6 to 12 months
- Yearly mammogram unless there was a double mastectomy
- Yearly pelvic exam for women taking tamoxifen

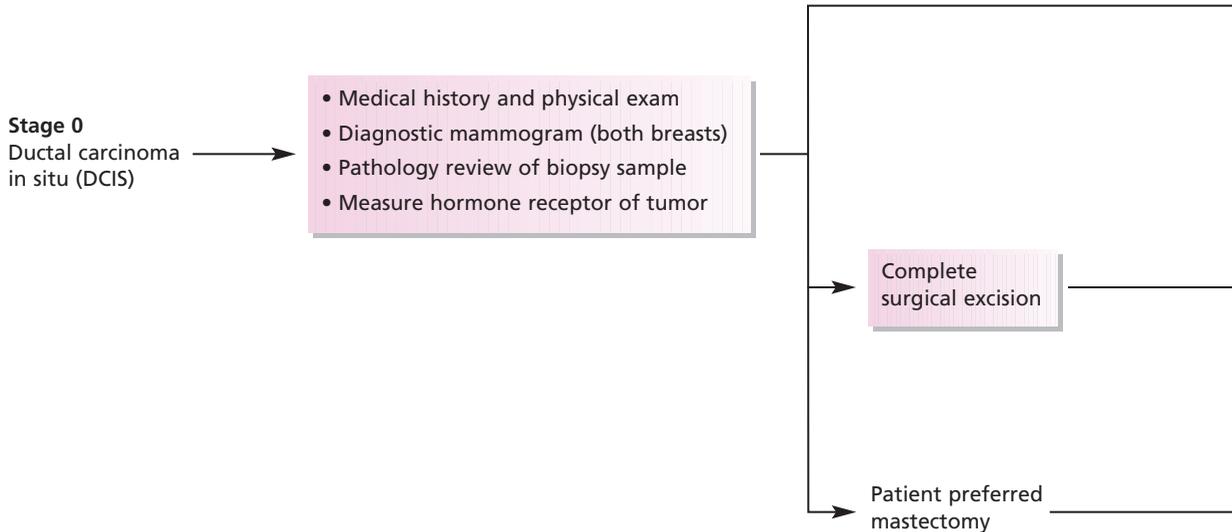
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have a very high risk of developing invasive breast cancer—for example, women who have many family members with breast cancer. Your doctor can help you decide whether to consider this treatment. You should also consider genetic counseling to see if you have a gene that increases your risk of developing breast cancer before deciding to have a preventive (prophylactic) mastectomy. After mastectomy, breast reconstruction is an option at the same time as the mastectomy or later on.

If you and your doctor decide on observation as the primary treatment for LCIS, the follow-up includes a medical history and physical exam every 6 to 12 months. You should have a mammogram every year. Because tamoxifen increases endometrial cancer risk in postmenopausal women, women taking this drug should have a pelvic exam each year and postmenopausal women should report any bleeding from the vagina right away. These precautions are not needed if the uterus has been removed (hysterectomy).

Stage

Work-Up (Evaluation)



Stage 0 Ductal Carcinoma in Situ

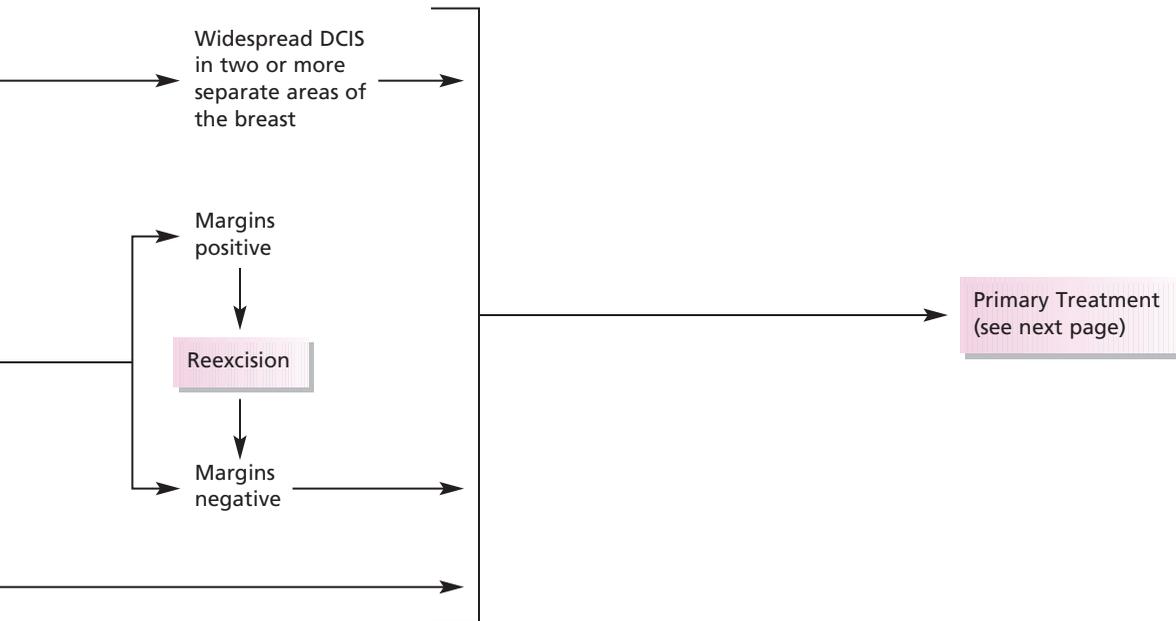
The work up for ductal carcinoma in situ (DCIS) begins with a complete medical history and physical examination. Diagnostic mammograms of both breasts should be done to help estimate how far DCIS has spread within the ducts of the breast and to check whether the opposite breast contains any abnormal areas. The NCCN recommends a pathology review (another pathologist to look at the biopsy sample) to be certain you

have DCIS and not an invasive cancer or other condition. The tumor should also be tested for hormone receptors. If any evidence of invasive cancer is seen in the biopsy, the woman's treatment should be according to the decision trees for invasive cancer. (See page 40.)

The NCCN recommends that the margin of normal tissue removed around the DCIS should be at least greater than 1 mm. If DCIS is present in only one area and no cancer is

Stage 0 Ductal Carcinoma in Situ

Findings



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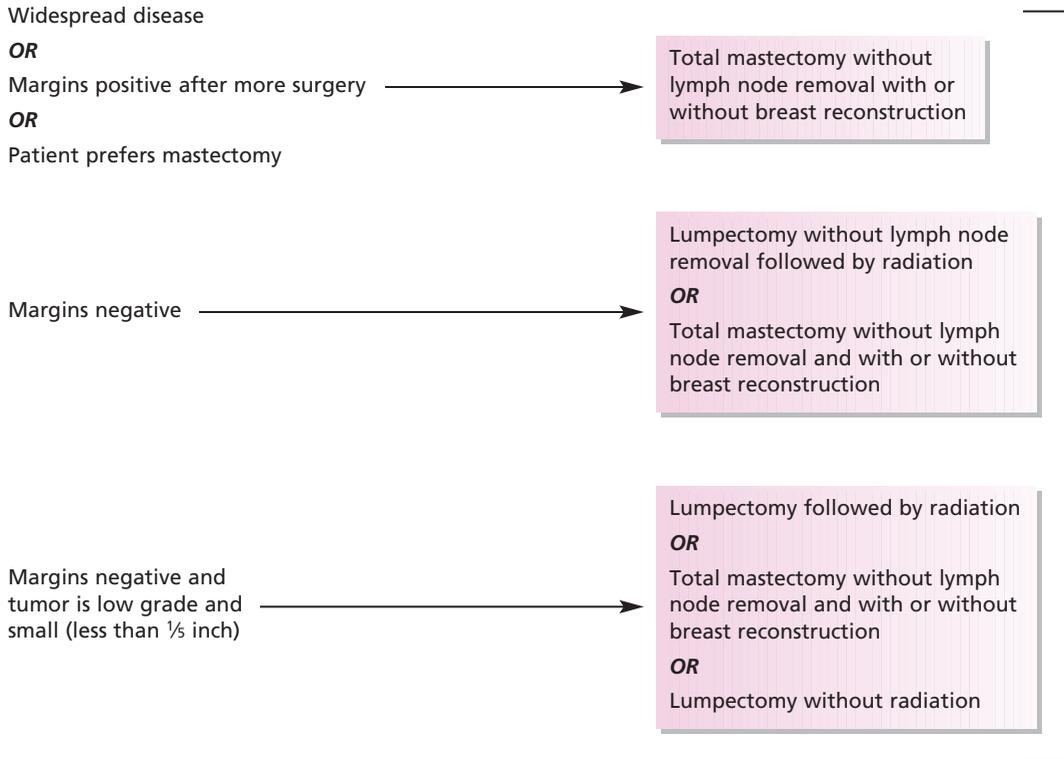
found at the edges of the first surgical excision, the surgical options are either a total mastectomy or a lumpectomy. Lymph node surgery (lymph node dissection or sentinel node biopsy) is generally not done with DCIS. If a lumpectomy is chosen, then radiation therapy to the whole breast with a boost to the site of the tumor may or may not be done depending on several factors, such as woman's age, other health problems, certain characteristics of the

tumor, and the woman's preference. The NCCN guidelines recommend that patients interested in partial breast irradiation participate in a clinical trial.

Mastectomy provides the most certain local control of DCIS. But studies have shown that women with DCIS who are treated with lumpectomy and radiation are in no greater danger of dying of breast cancer than those who have a mastectomy. They do have a risk

Findings

Primary Treatment



of the cancer coming back in the breast, which would require a mastectomy. Mastectomy is recommended if the margins of the excision contain cancer and even with repeat surgery the DCIS cannot be completely removed. Radiation is not needed if a mastectomy is done unless the DCIS is at the margin of the mastectomy. If the mammogram, physical examination or biopsy results show that two

or more separate areas of the breast contain DCIS, mastectomy is recommended. With mastectomy, sentinel lymph node biopsy may be done to be certain there is no invasive cancer present, but an axillary lymph node dissection is not needed.

After lumpectomy, a mammogram is suggested to ensure that the entire tumor has been removed.

Stage 0 Ductal Carcinoma in Situ (continued)

Treatment After Surgery

Follow-Up

Consider tamoxifen for 5 years for patients with ER-positive DCIS treated with lumpectomy with or without radiation

- Medical history and physical exam every 6 months for 5 years, then every year;
- Mammogram every year
- Yearly pelvic exam for women taking tamoxifen

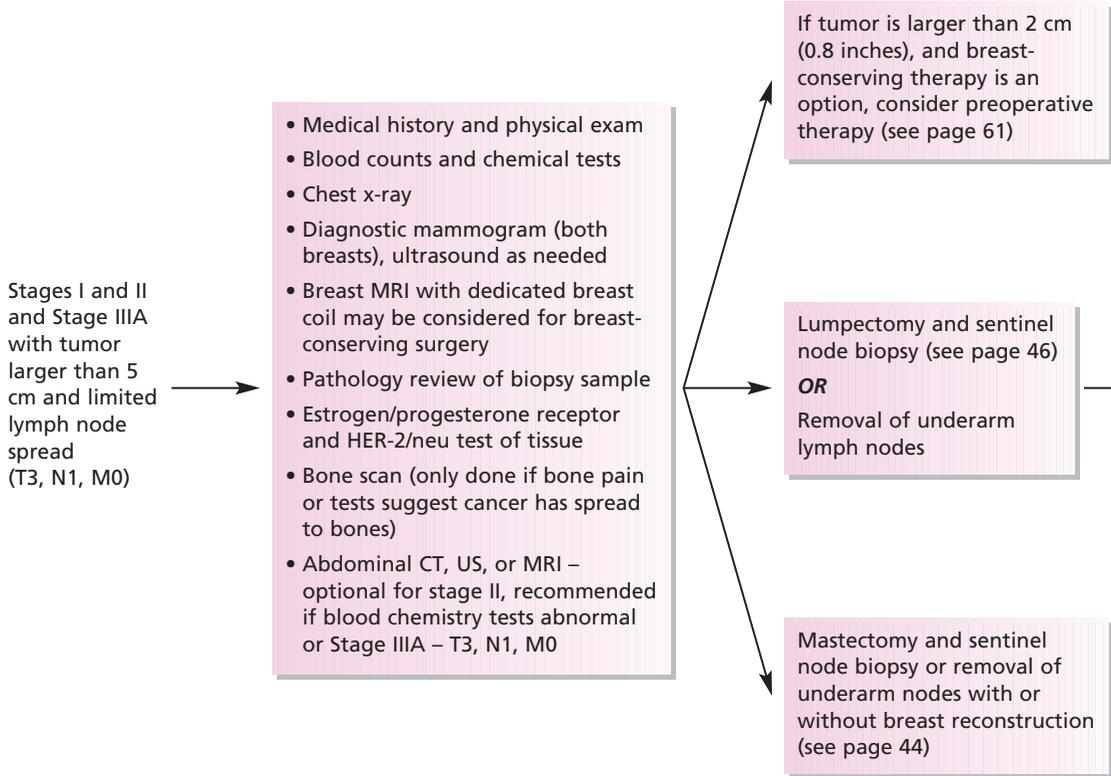
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Women with DCIS who are treated with mastectomy can choose to have either immediate or delayed breast reconstruction. Women with DCIS treated with lumpectomy with or without radiation and who have estrogen receptor positive tumors should consider taking tamoxifen for 5 years. In women who have had lumpectomy for DCIS, tamoxifen can lower the risk of developing an invasive breast cancer in the same breast.

Follow-up for women with DCIS includes a medical history and physical exam every 6 months for 5 years, then every year thereafter. They should have yearly mammograms. Because tamoxifen increases endometrial cancer risk in postmenopausal women, patients taking this drug should have a pelvic exam every year and should promptly report any abnormal vaginal bleeding. These precautions are not needed if the uterus was removed.

Clinical Stage

Work-Up (Evaluation)



Stage I, II, and Some Stage III Breast Cancer

The guidelines for women with stage I and II tumors, and those stage IIIA tumors larger than 5 centimeters (2 inches) with breast cancer in the lymph nodes, but not attached to each other (T3, N1, M0), recommend the following:

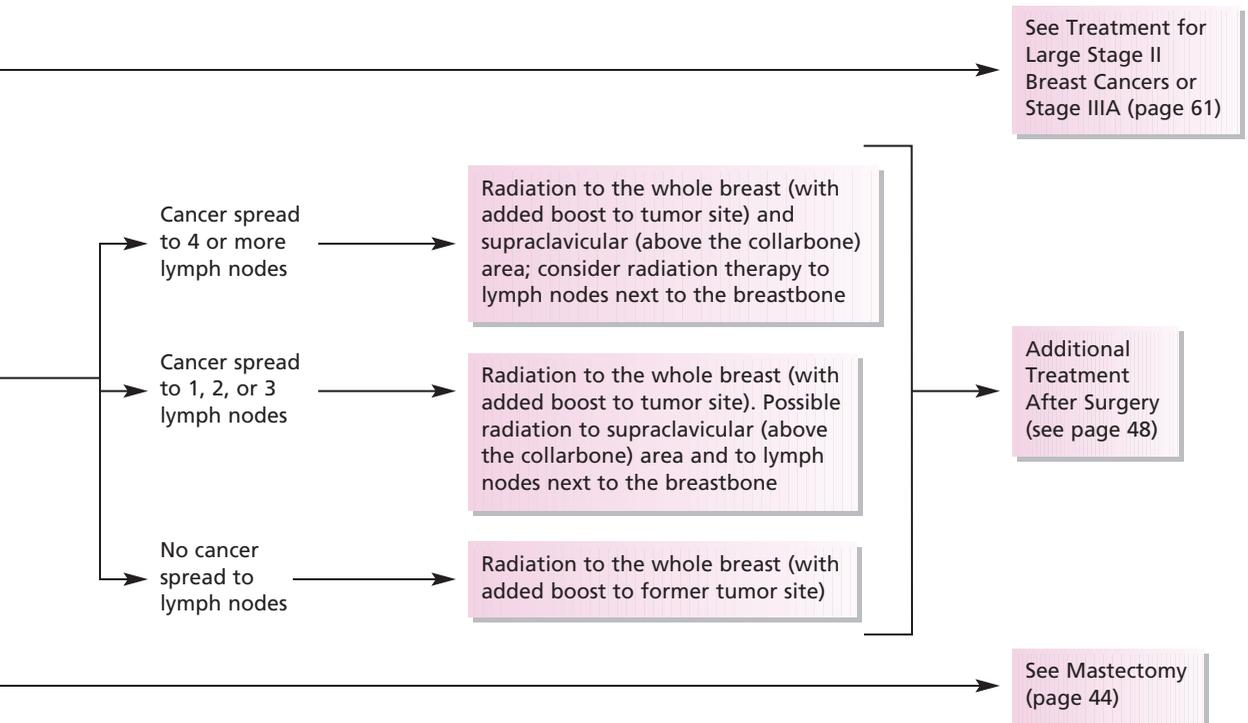
- medical history and physical examination
- complete blood count, platelet count, and liver function tests

- chest x-ray
- diagnostic mammograms of both breasts
- breast ultrasound and MRI if needed
- pathology review of biopsy sample
- tests for the presence of hormone receptors
- HER-2/neu test

Bone scan may be ordered and is recommended if there is bone pain or abnormal blood tests.

Stage I, II, and Some Stage III Breast Cancer

Stage I, II, and Some Stage III (T3, N1, M0)



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Abdominal CT scan, ultrasound, or MRI may be ordered for stage II and is recommended if the blood tests are abnormal or the stage is IIIA (T3,N1, M0).

For patients with Stage I or II breast cancer, the surgery can either be a lumpectomy (removing only the cancer and a margin of surrounding normal tissue) or complete

removal of the breast (mastectomy). This decision tree only addresses lumpectomy, while mastectomy is addressed on page 44. Lumpectomy as the surgical treatment is possible in most women with stage I or II breast cancer. If the tumor is large (i.e. greater than 2 cm in diameter), breast-conserving surgery is sometimes done after chemotherapy

(see page 61). Radiation to the whole breast is recommended as part of the treatment following lumpectomy in most cases. Extra radiation should be given to the area of the breast where the tumor was removed. Breast irradiation may be omitted in some patients over 70 years old with small, hormone receptor positive tumors that do not have lymph node involvement and who are treated with hormone therapy. The NCCN guidelines recommend that patients interested in partial breast irradiation should participate in a clinical trial.

In addition to removing the cancer by lumpectomy or mastectomy, the lymph nodes under the arm are examined to see if they

contain cancer. There are 2 choices for examining the lymph nodes—complete axillary lymph node dissection or sentinel lymph node biopsy (see discussion in the first part of this booklet). This is further described on page 46. Not all patients need lymph node evaluation; these include patients with favorable tumors, where selection of additional treatment will not be based on whether or not the lymph nodes are involved, or in patients with other serious medical conditions. These specific circumstances should be discussed with your doctor. If the cancer has spread to lymph nodes, radiation to these areas may be given, depending on the number of involved nodes.

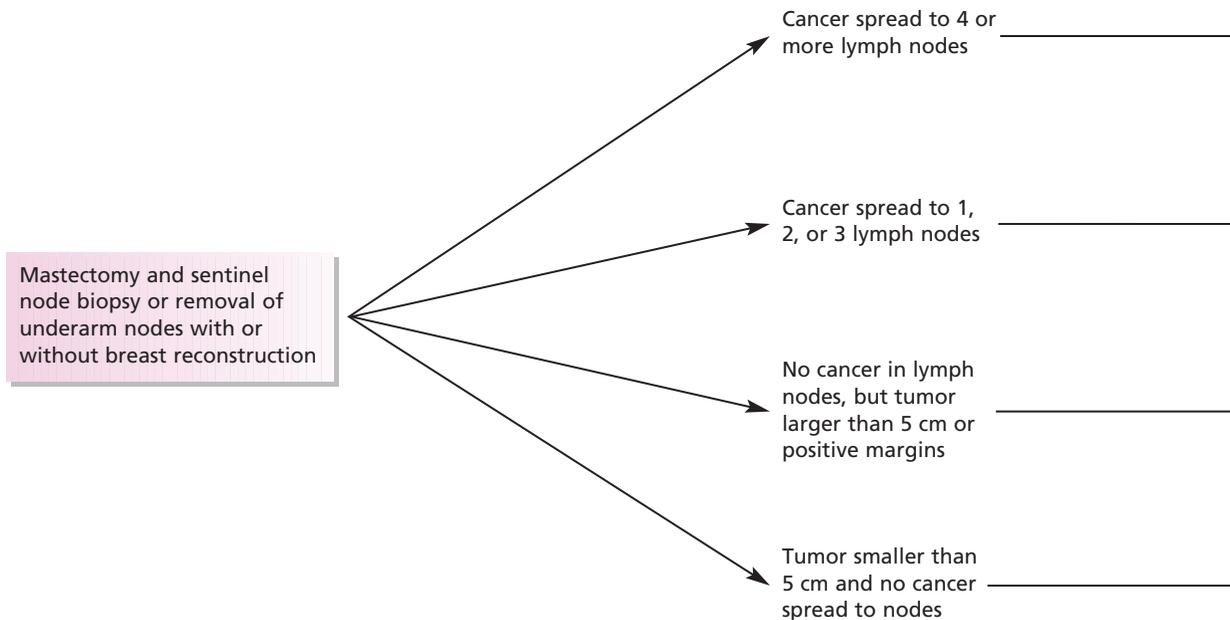
NOTES

Stage I, II, and Some Stage III Breast Cancer (continued)

In choosing breast-conserving surgery versus mastectomy, women must understand that as long as lumpectomy can be done satisfactorily (based on the factors that follow), the chances of successful treatment and survival are the same with lumpectomy and radiation as with mastectomy. The reasons for choosing lumpectomy and mastectomy are discussed in the first part of this booklet. Lumpectomy and radiation therapy are not appropriate in the following women:

- prior radiation therapy of the affected breast or chest
- suspicious or malignant appearing abnormalities that are widespread throughout the breast
- women whose lumpectomy, including any possible repeat lumpectomy when needed, cannot completely remove their cancer with a satisfactory cosmetic result
- women with active connective tissue disease involving the skin (especially scleroderma or lupus) that makes body tissues especially sensitive to the side effects of radiation
- pregnant women who would require radiation while still pregnant
- women whose tumor is larger than 5 centimeters (2 inches) and can't be shrunk by treatment before surgery

NOTES

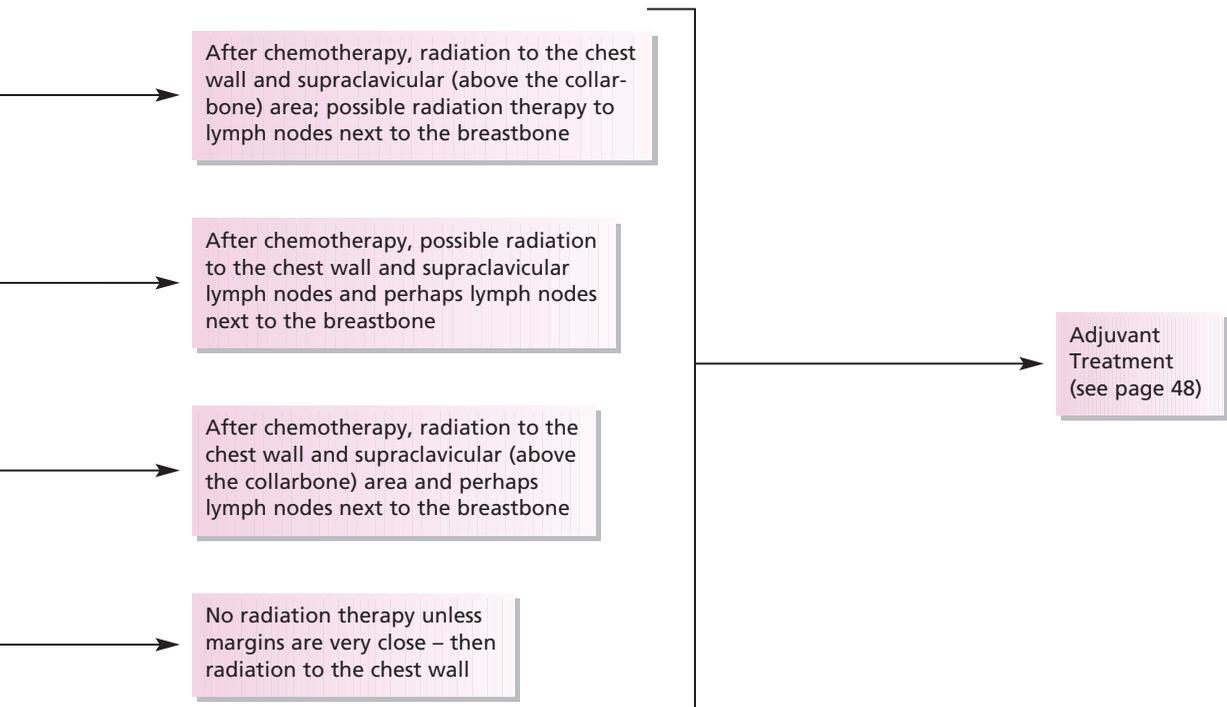


If a woman and her doctor choose a mastectomy as her breast cancer treatment, the guidelines recommend radiation after surgery in the following situations:

- If the cancer has spread to 4 or more lymph nodes, radiation should be given to the area that the breast was removed from (the chest wall), the area above the collarbone and perhaps the part of the chest near the breast bone
- If the cancer has spread to 1 to 3 lymph nodes, there should be consideration given to using radiation for the area that the breast was removed from (the chest wall), the area above the collarbone, and perhaps the part of chest near the breastbone.
- Even if there is no spread to lymph nodes, if the tumor is larger than 5 cm or the margins are positive, radiation

Stage I, II, and Some Stage III Breast Cancer (continued)

Stage I, II, and Some Stage III (T3, N1, M0)



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should be given to the area that the breast was removed from (the chest wall) and possibly the area above the collarbone and near the breastbone.

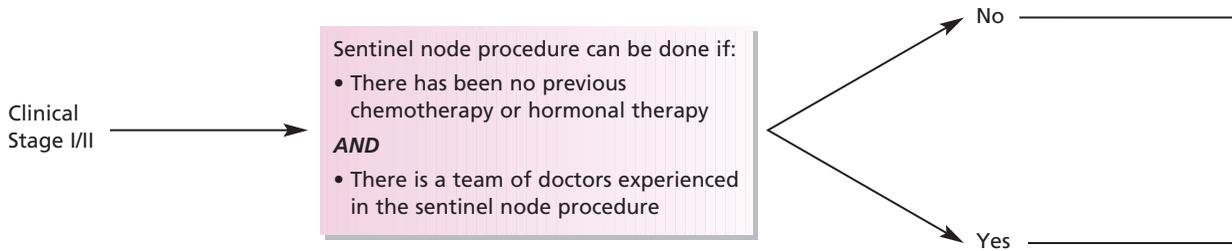
- If the tumor is less than 5 cm and the margins are very close, radiation should be given to the area that the breast was removed from (the chest wall).

No radiation is needed if the tumor is smaller than 5 centimeters, with good margins, and no spread to lymph nodes.

In all cases where both radiation and chemotherapy are used, the radiation is given after chemotherapy unless the chemotherapy regimen is CMF. CMF and radiation can be given together.

Stage

Procedure



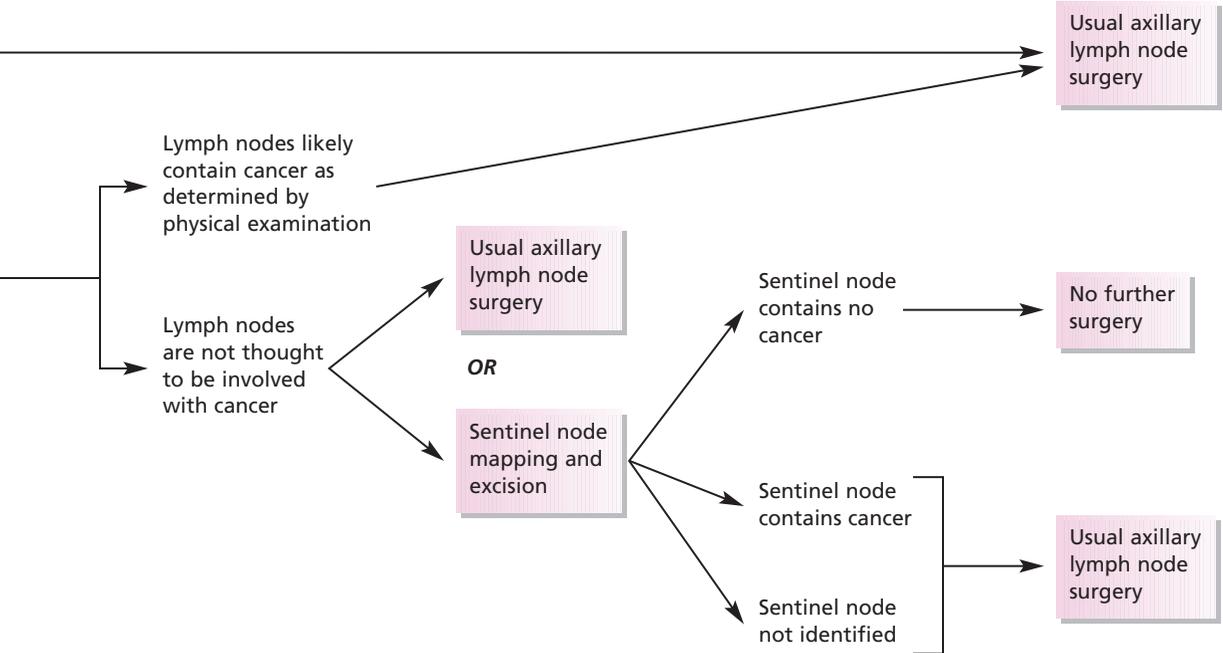
Axillary Lymph Node Surgery

In addition to the surgery for the cancer in the breast, the lymph nodes under the arm are examined in most cases. This provides information to guide further treatment and is usually done at the same time as the breast surgery.

The types of surgery for lymph nodes under the arm are fully discussed in the first section

of this booklet. The choices are complete removal of the lymph nodes (axillary lymph node dissection) or removal of a few lymph nodes in the sentinel lymph node biopsy procedure. In a mastectomy, the lymph nodes are removed through the same incision (cut in the skin). In a lumpectomy, it is usually done through an incision separate from the lumpectomy incision.

Axillary Lymph Node Surgery



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Sentinel lymph node biopsy is not appropriate for all women. It should only be used if the woman has not yet had any chemotherapy or hormone therapy, and when the nodes are not enlarged and are not thought to contain cancer based on physical examination at the time of diagnosis. If a suspicious node is found

on physical exam, it can be first assessed with a needle biopsy and examined under the microscope. If this biopsy shows no evidence of cancer, a sentinel node biopsy is still considered appropriate. A sentinel node biopsy should only be done if the team of doctors has proven experience with this procedure.

Additional Treatment (Adjuvant Therapy) After Surgery

often treated with combinations of these therapies—hormone therapy, trastuzumab and chemotherapy, depending on the status of the hormone receptors, HER-2 status, and the risk for recurrence.

Specific recommendations regarding type of hormone therapy are discussed on page 56. Not enough data exists to make strong recommendations regarding adjuvant chemotherapy for those over the age of 70. Decisions regarding chemotherapy in this group should take into consideration other health conditions.

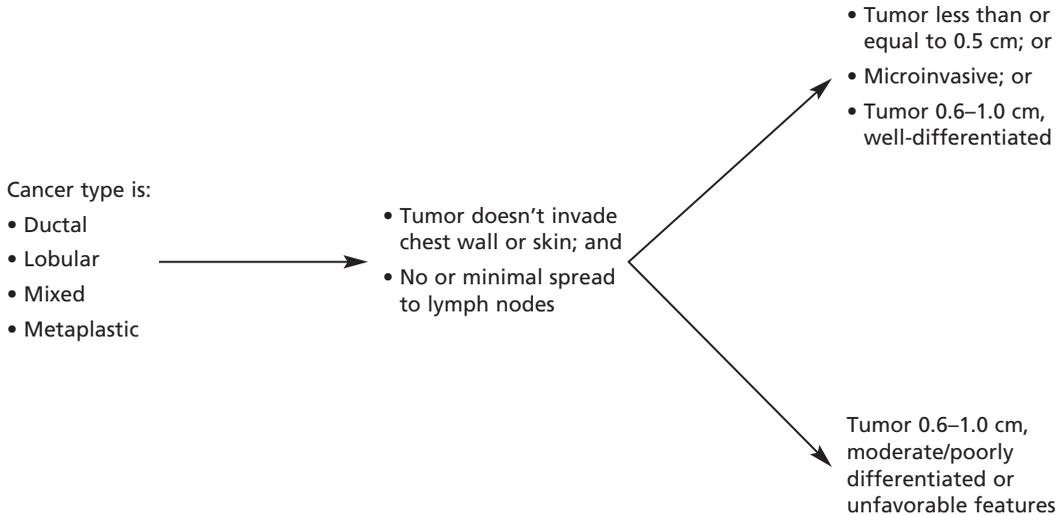
The decision trees on the following pages divide patients into three broad groups:

- those with small invasive ductal or lobular cancers (and its variants) with minimal or no lymph node involvement
- those with larger invasive ductal or lobular cancers, or cancers involving lymph nodes
- those with cancers with a more favorable outlook, i.e. tubular or colloid subtypes.

NOTES

Breast Cancer Type

Size of Tumor

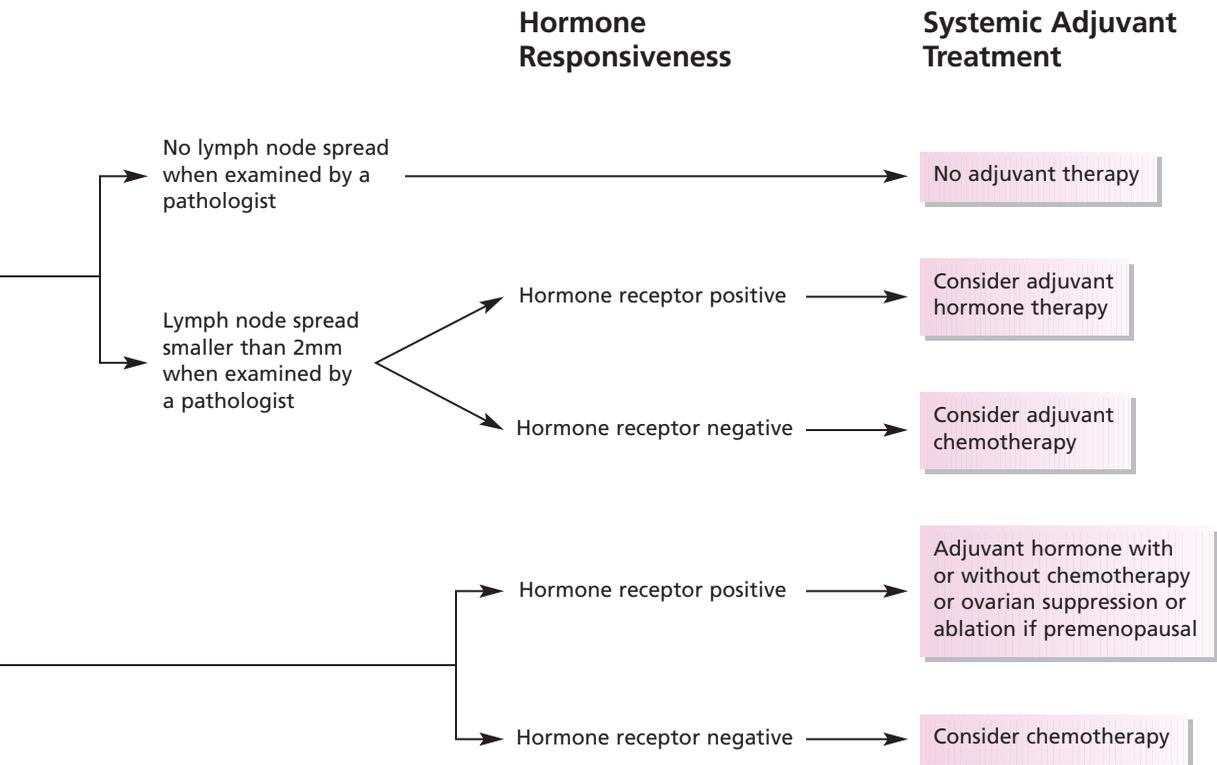


Invasive Ductal, Lobular, Mixed, or Metaplastic Cancers with Small Tumors

This decision tree describes patients with invasive ductal, lobular, mixed or metaplastic cancer that measures up to 1 cm in diameter. The tumor has not spread to the chest wall or skin and the lymph nodes are either not involved, or only one lymph node shows a very small deposit of cancer:

- If the tumor is smaller than 0.5 cm, or is a well-differentiated tumor and is no larger than 1 cm, or the tumor is considered microinvasive, then no adjuvant treatment is needed. If there is lymph node spread smaller than 2 mm, hormone therapy may be given if the tumor is hormone receptor positive and chemotherapy may be given if the tumor is hormone receptor negative.

Additional Treatment for Invasive Ductal, Lobular, Mixed, or Metaplastic Cancers with Small Tumors



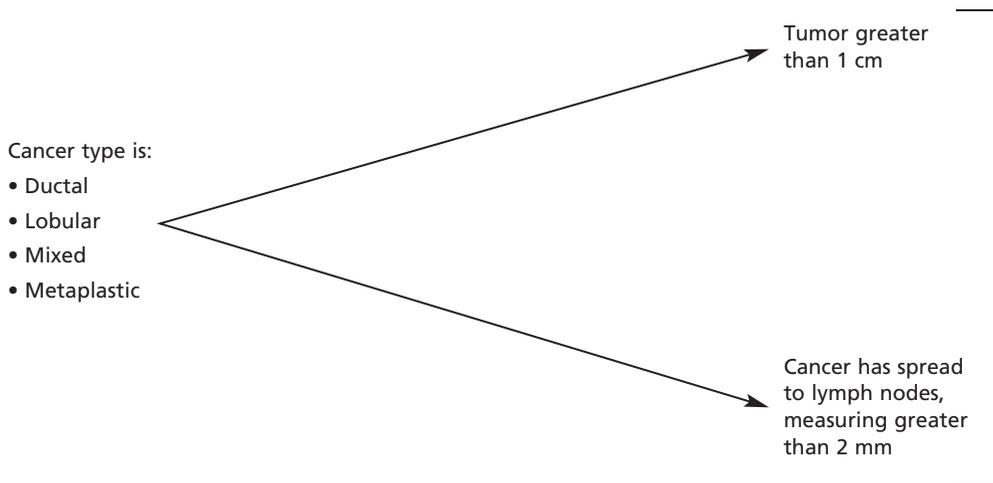
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- When the tumor measures 0.6 to 1 cm, is moderately or poorly differentiated or has unfavorable features (such as looking aggressive under the microscope), hormone therapy with or without chemotherapy is given if the tumor is hormone receptor positive. Chemotherapy alone is given if the tumor is hormone receptor negative.

- Whenever chemotherapy is given, it should be given before hormone therapy.
- Ovarian ablation using surgery, radiation therapy, or drugs (LHRH agonists or antagonists) may be recommended in premenopausal women, although the benefit is uncertain in those who have received adjuvant chemotherapy.

Breast Cancer Type

Size of Tumor

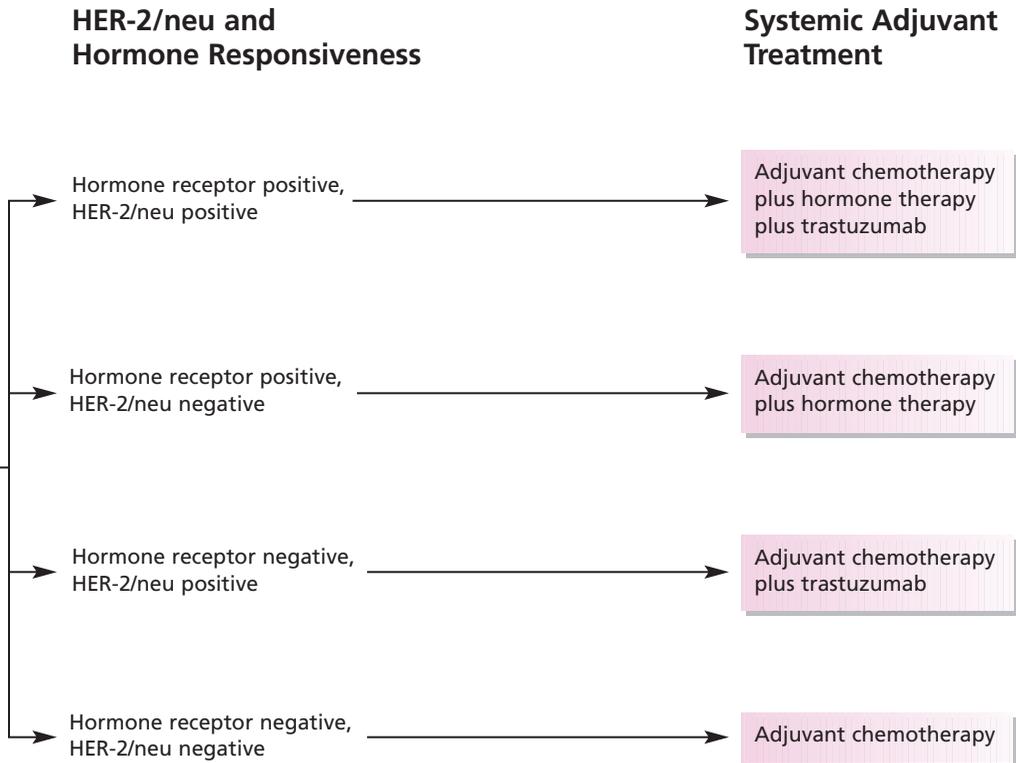


Invasive Ductal, Lobular, Mixed, or Metaplastic Cancers with Larger Tumors or Lymph Node Spread

This decision tree focuses on tumors that are greater than 1 cm in diameter and/or with positive lymph nodes. The HER-2 and hormone receptor status of the tumor are also important in choosing therapy.

- Chemotherapy is recommended for all patients in this category. Hormone therapy and/or trastuzumab are also used depending upon the features of the tumor. Hormone therapy is recommended if the tumor is hormone receptor positive, and trastuzumab is recommended if the tumor is HER-2

Additional Treatment for Invasive Ductal, Lobular, Mixed, or Metaplastic Cancers with Larger Tumors or Lymph Node Spread



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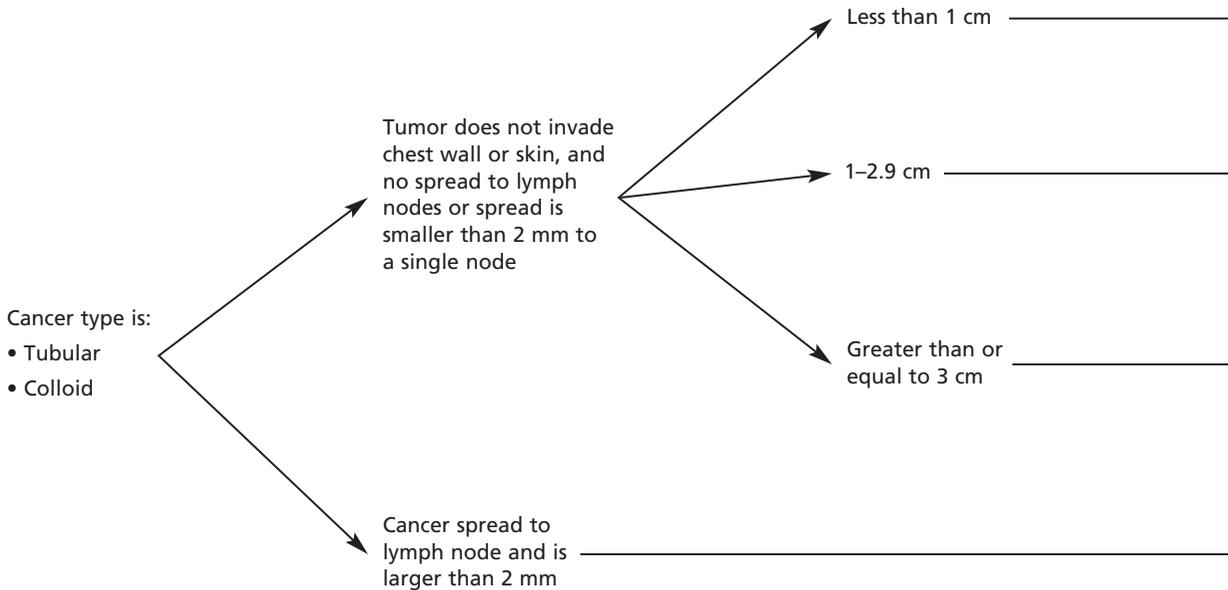
positive. Whenever chemotherapy is given, it should be given before hormone therapy.

- The decision to take chemotherapy, hormone therapy, and/or trastuzumab is an important decision in the treatment of breast cancer. Your doctor should

be able to estimate the likelihood that they will improve your outcome. Along with your doctors, you should balance the benefits and the side effects of the treatment to decide if the treatments are right for you.

Breast Cancer Type

Size of Tumor

***Tubular or Colloid Breast Cancers***

This decision tree addresses tubular or colloid breast cancers, which have a more favorable outlook than other types of breast cancer. The hormone receptor status is an important factor in deciding treatment in these tumors, but HER-2 status is not, since these tumors are usually HER-2 negative. In fact, the diagnosis of tubular cancer should be questioned if the tumor is either hormone receptor negative or HER-2 positive. The treatment options for tubular and colloid tumors are based on the size of tumor and

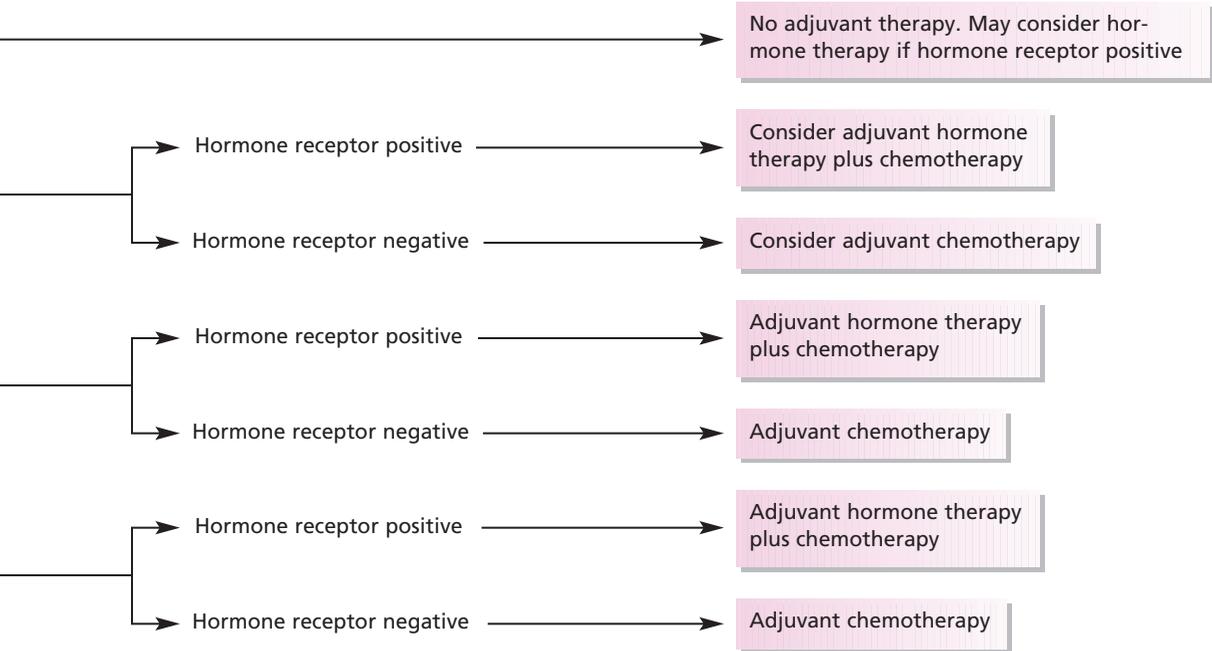
lymph node status, as well as the status of hormone receptors. NCCN recommends the following:

- For tumors smaller than 1 cm with no or a very small amount of spread in one lymph node, no treatment is needed after surgery, although hormone therapy may be considered if the tumor is hormone receptor positive.
- If the tumor is between 1 and 2.9 cm in size, with no or a very small amount of spread in one lymph node, adjuvant chemotherapy may be considered,

Additional Treatment for Tubular or Colloid Breast Cancers

Hormone Responsiveness

Systemic Adjuvant Treatment



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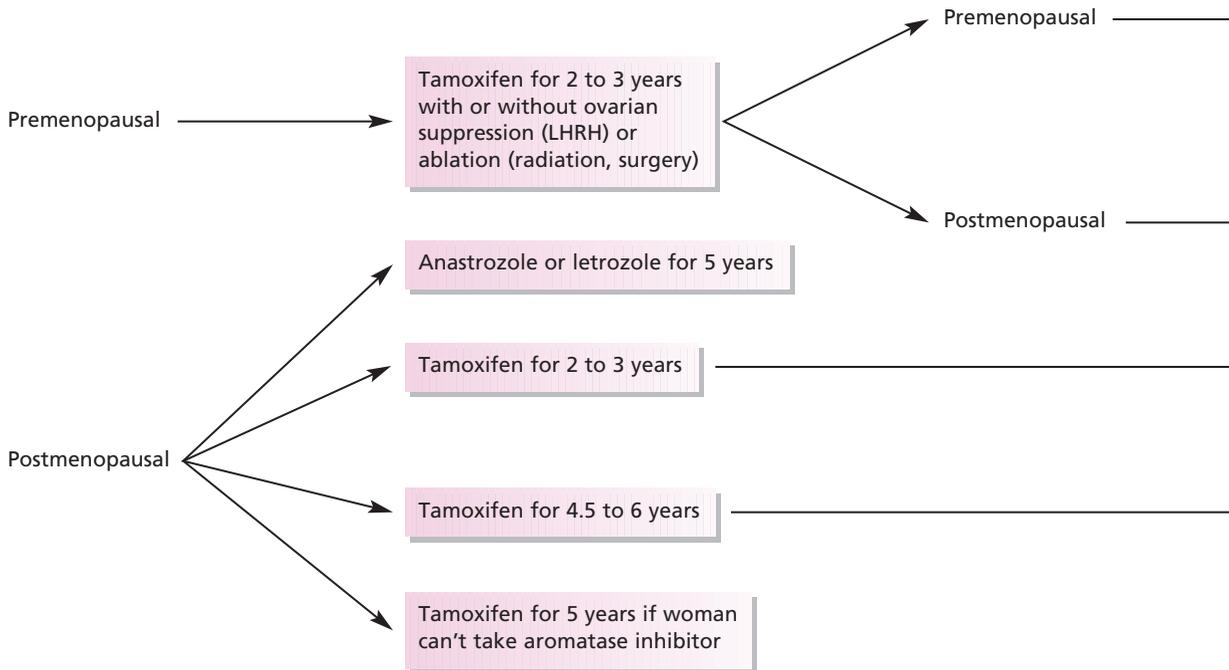
with the addition of hormone therapy for those whose tumor has positive hormone receptors.

- Adjuvant chemotherapy is more strongly recommended for tumors 3 cm in diameter or larger, or those with positive lymph nodes. Hormone therapy is added if the tumor is hormone receptor positive.

The benefits of chemotherapy and hormone therapy are additive. However, the benefit of chemotherapy may be minimal in patients over 60 years-old with good prognosis tumors who are already receiving hormone therapy. In these patients, the decision to add chemotherapy to hormone therapy should be individualized.

Menopausal Status

Adjuvant Treatment



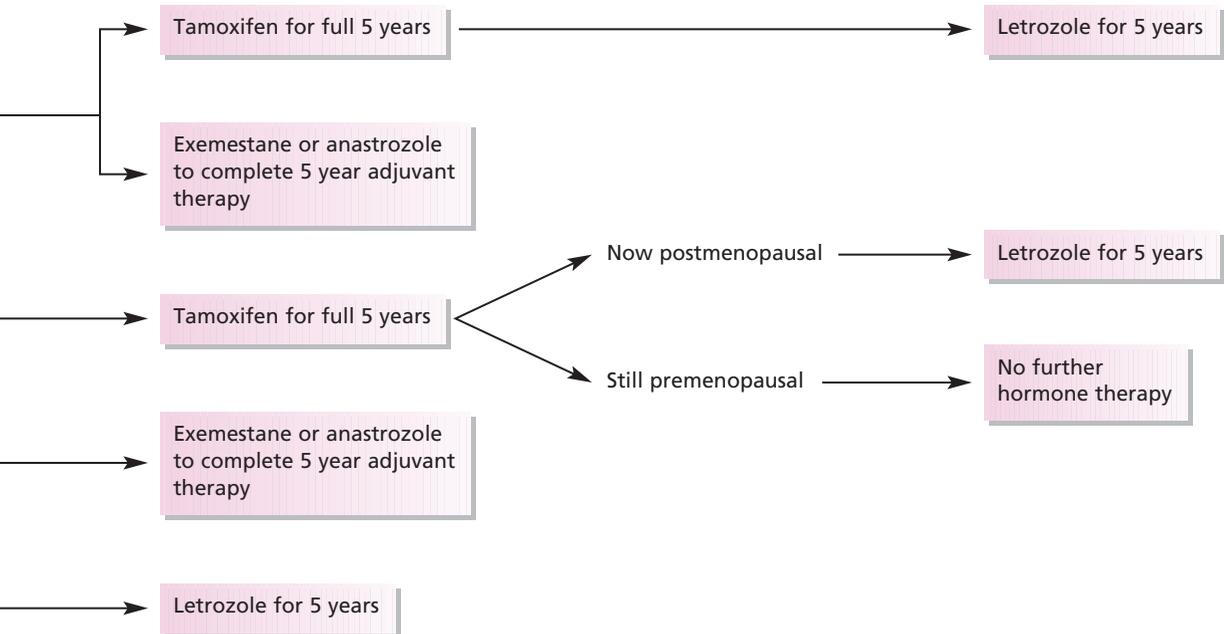
Adjuvant Hormone Treatment

This describes the options for adjuvant hormonal treatment after breast surgery in women whose cancers contained hormone receptors. In the past, tamoxifen has been the standard therapy. Results of recent clinical trials have pointed to new treatments, particularly the use of aromatase inhibitors (anastrozole,

letrozole or exemestane) in postmenopausal women. Although all aromatase inhibitors are probably equally effective, they are specifically named in this decision tree, based on the results of clinical trials.

Tamoxifen is the recommended hormone treatment for premenopausal patients. Treatment with tamoxifen followed by an

Additional (Adjuvant) Hormone Treatment



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aromatase inhibitor, or an aromatase inhibitor alone is recommended for postmenopausal women. Treatment with tamoxifen followed by an aromatase inhibitor is an option for premenopausal women who become postmenopausal during tamoxifen treatment.

If use of an aromatase inhibitor is considered in a woman who was premenopausal

at the time of her diagnosis of breast cancer, she should be monitored for hormone levels such as estradiol and FSH to make sure that she is truly postmenopausal.

For premenopausal women, tamoxifen for 2 to 3 years is recommended. While tamoxifen alone is often recommended, another option is to combine tamoxifen with efforts to

Clinical Stage

Work-Up

The cancer is larger than 2 cm and doesn't invade chest wall or skin. Lymph nodes can be enlarged but are movable. Diagnosed by needle biopsy not excision. Breast-conserving surgery not possible because too large a tumor in the breast.

- Medical history and physical examination
- Blood counts and chemistry tests
- Chest imaging
- Diagnostic mammograms (both breasts)
- Breast MRI with dedicated breast coil may be considered
- Pathology review of biopsy sample
- Hormone receptor tests
- HER-2/neu test
- Bone scan and CT, MRI, or ultrasound of abdomen if symptoms or abnormal blood tests or tumor over 5 cm with lymph node spread

Wants to preserve breast (Consider needle biopsy of enlarged lymph nodes or sentinel node procedure. Tumor should be marked so it can be located after chemotherapy.)

Doesn't want to preserve breast

Treatment of Large Stage II or Stage IIIA Breast Cancers

Breast-conserving treatment is usually not recommended for women with large tumors. However, chemotherapy may shrink the tumor enough to permit a lumpectomy that completely removes the main tumor and still keeps the size and shape of the breast acceptable. *Preoperative chemotherapy* is an option

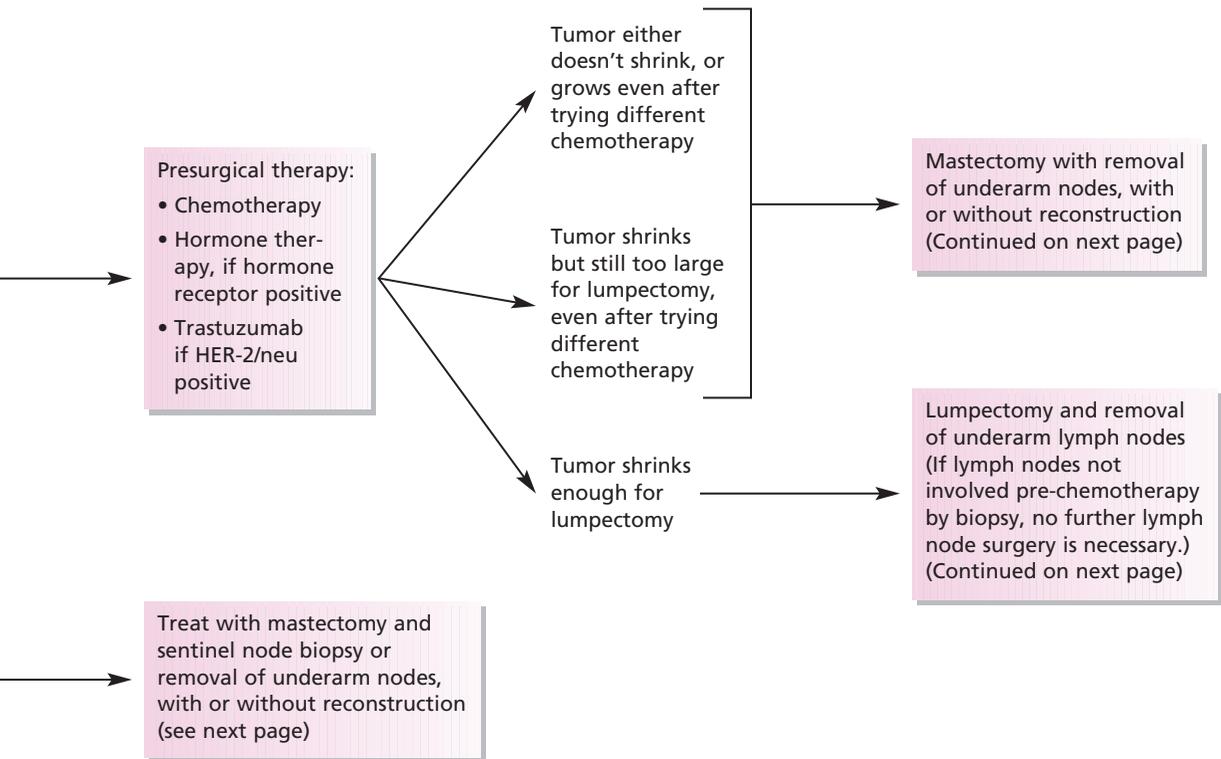
that allows some women with large tumors (larger than 2 cm) that have not spread to the skin or chest wall to have breast-conserving treatment if they want it.

The work-up recommended before starting preoperative chemotherapy includes:

- medical history and physical examination
- blood counts and chemical tests

Treatment of Large Stage II or Stage IIIA Breast Cancers

Primary Treatment



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- CT scan of the chest or chest x-ray
- diagnostic mammography of both breasts
- breast ultrasound and MRI if needed
- pathology review of biopsy sample
- hormone receptor test of the tumor
- HER-2/neu test of the tumor
- bone scan and CT, MRI or ultrasound of the abdomen if the tumor is larger than 5 cm (2 inches) with lymph node spread, or if there are symptoms of bone spread, such as pain or abnormal blood tests.

Primary Treatment (Local)**Adjuvant (Additional)
Treatment**

Mastectomy with underarm lymph node removal, with or without reconstruction. Removal of underarm nodes may be omitted if sentinel node biopsy done pre-chemotherapy finds no cancer.



Possible additional chemotherapy (before radiation)



Lumpectomy with underarm lymph node removal, with or without reconstruction. Removal of underarm nodes may be omitted if sentinel node biopsy done pre-chemotherapy finds no cancer.



Possible additional chemotherapy (before radiation)



After mastectomy or lumpectomy, more chemotherapy may be recommended, depending on the tumor size and number of positive lymph nodes. If the tumor was hormone receptor-positive, hormone therapy should be given. If a lumpectomy was done, it should

be followed by radiation therapy to the whole breast and sometimes to the surrounding lymph nodes. The decision to treat the lymph nodes with radiation, or the decision to treat the skin after mastectomy is based on the same principles as in Stage I and II on page 44.

Treatment of Large Stage II or Stage IIIA Breast Cancers (continued)

Radiation Therapy

Radiation therapy (after surgery)
depending on tumor size and
lymph node status (see page 44)

AND

Hormonal therapy if hormone
receptor-positive.

Radiation therapy (after surgery)
depending on tumor size and
lymph node status (see page 44)

AND

Hormonal therapy if hormone
receptor-positive.

See follow-up
care on page 70

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NOTES

Clinical Stage

Work-Up

Preoperative
Chemotherapy

Stage III
(Tumor growing
into chest wall or
skin, or enlarged
lymph nodes can
be felt)

- Medical history and physical examination
- Blood count and chemistry tests
- Chest CT scan with or without x-ray
- Diagnostic mammograms (both breasts), ultrasound, as needed
- Breast MRI with dedicated breast coil if needed for breast-conserving surgery
- Pathology review of biopsy sample
- Pre-chemotherapy hormone receptor tests, HER-2/neu test
- Bone scan
- CT, MRI, or ultrasound of abdomen

- Doxorubicin- or epirubicin- based or docetaxel-based preoperative chemotherapy preferred
- Patients with tumors over-expressing HER-2/neu should be considered for neoadjuvant chemotherapy incorporating trastuzumab

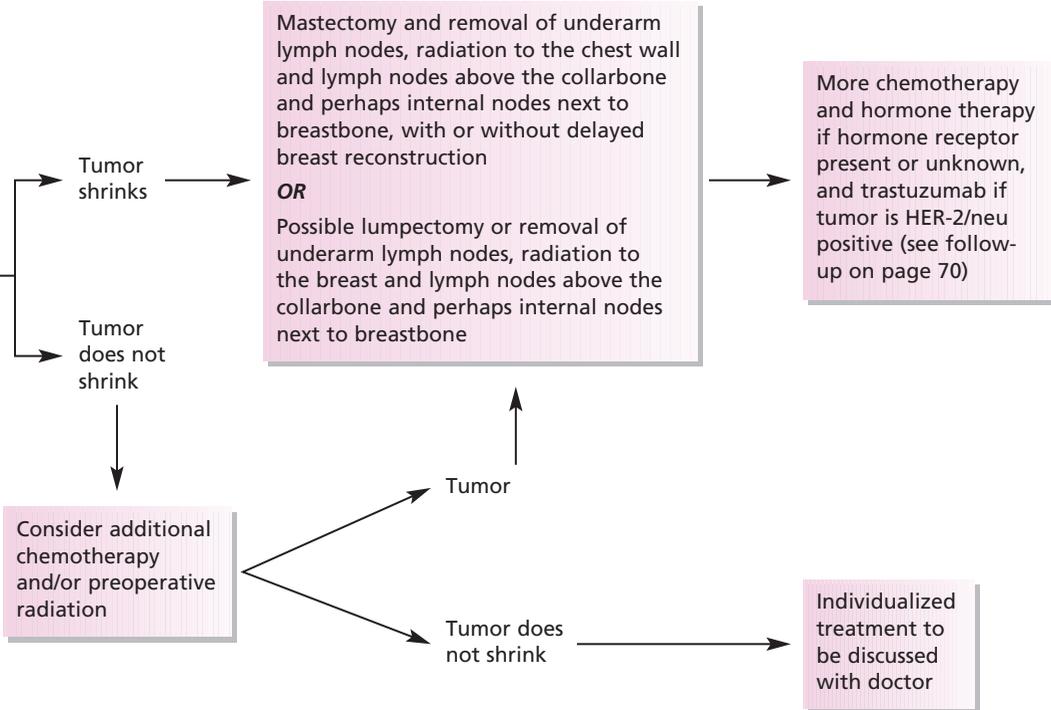
Stage III Locally Advanced Breast Cancers

These are advanced cancers that are growing into the skin or chest wall or have enlarged lymph nodes that are matted together. There is no evidence of spread anywhere else in the body. The recommended work-up for these stage III breast cancers includes:

- medical history and physical examination
- blood counts and blood tests to measure liver function
- chest CT scan and perhaps chest x-ray
- diagnostic mammograms of both breasts
- breast ultrasound test and/or breast MRI (if needed)
- pathology review (second opinion on the biopsy samples)
- hormone receptor test of the biopsy sample
- HER-2/neu test of the biopsy sample
- bone scan
- CT, MRI, or ultrasound of the abdomen

Stage III Locally Advanced Breast Cancers

Primary Treatment



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The treatment for locally advanced breast cancer starts with chemotherapy given before surgery. The chemotherapy regimen should contain an anthracycline (doxorubicin or epirubicin) or a taxane (paclitaxel or docetaxel)

and should include trastuzumab if the tumor is HER-2 positive. Patients whose tumors shrink enough to be surgically removed have 3 options:

Routine Follow-Up

- History and physical exam every 4 to 6 months for 5 years, then every year
- Mammograms every year. For lumpectomy patients, the first one should be 6 months after radiation
- Women taking tamoxifen: pelvic exam every year if the uterus is present
- Women on aromatase inhibitor or who have gone through early menopause with chemotherapy should have bone density monitored.

Work-Up for Stage IV or Suspected Recurrence

- Medical history and physical examination
- Blood count, chemistry tests, and liver function tests
- Chest imaging
- Bone scan
- X-rays of bones that hurt and weight-bearing bones that are abnormal on bone scan
- CT or MRI of chest and abdomen and/or PET scan may be recommended
- Biopsy of suspected recurrence if possible
- ER/PR and HER-2/neu testing if not known, hormone receptor previously negative, or HER-2/neu negative

Follow-up and Treatment of Stage IV Disease or Recurrence of Disease

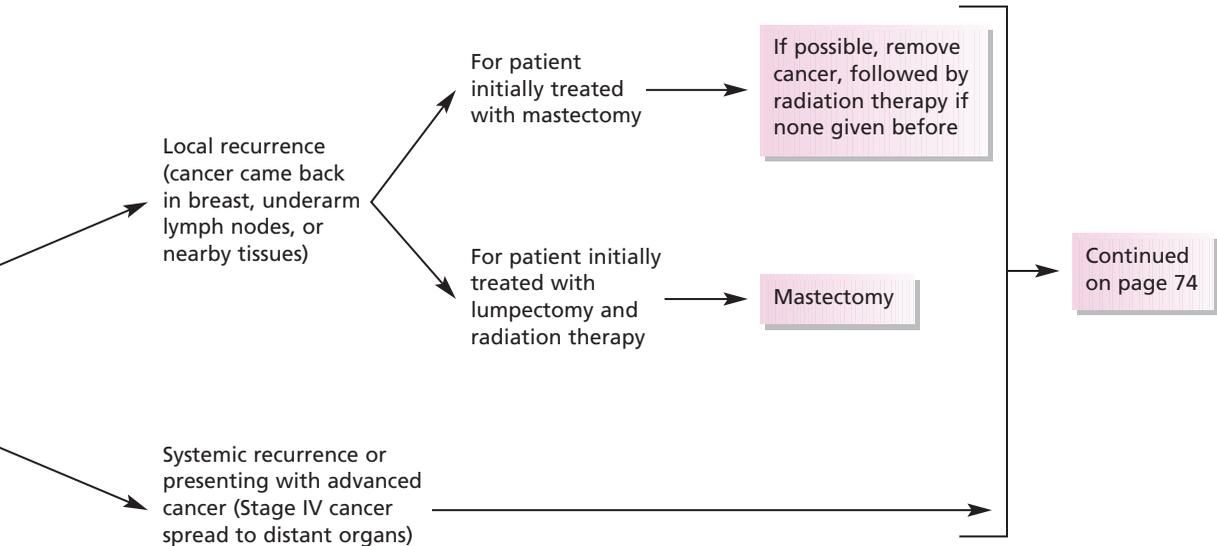
Routine follow-up for all patients who have had invasive breast cancer includes the following: a medical history and physical exam every 4 to 6 months for 5 years, then once a year.

Women who have had a lumpectomy should have a mammogram of the treated breast 6 months after radiation therapy, and then mammograms of both breasts every year.

Women who have had a mastectomy should have a yearly mammogram of the remaining breast after the surgery. Because tamoxifen increases a woman's risk of developing cancer of the uterus, women taking this drug should have a yearly pelvic exam and should promptly tell their doctor if there is any abnormal bleeding from the vagina. Women on an aromatase inhibitor or who went through early menopause on treatment

Follow-up and Treatment of Stage IV Disease or Recurrence of Disease

Treatment of Recurrence



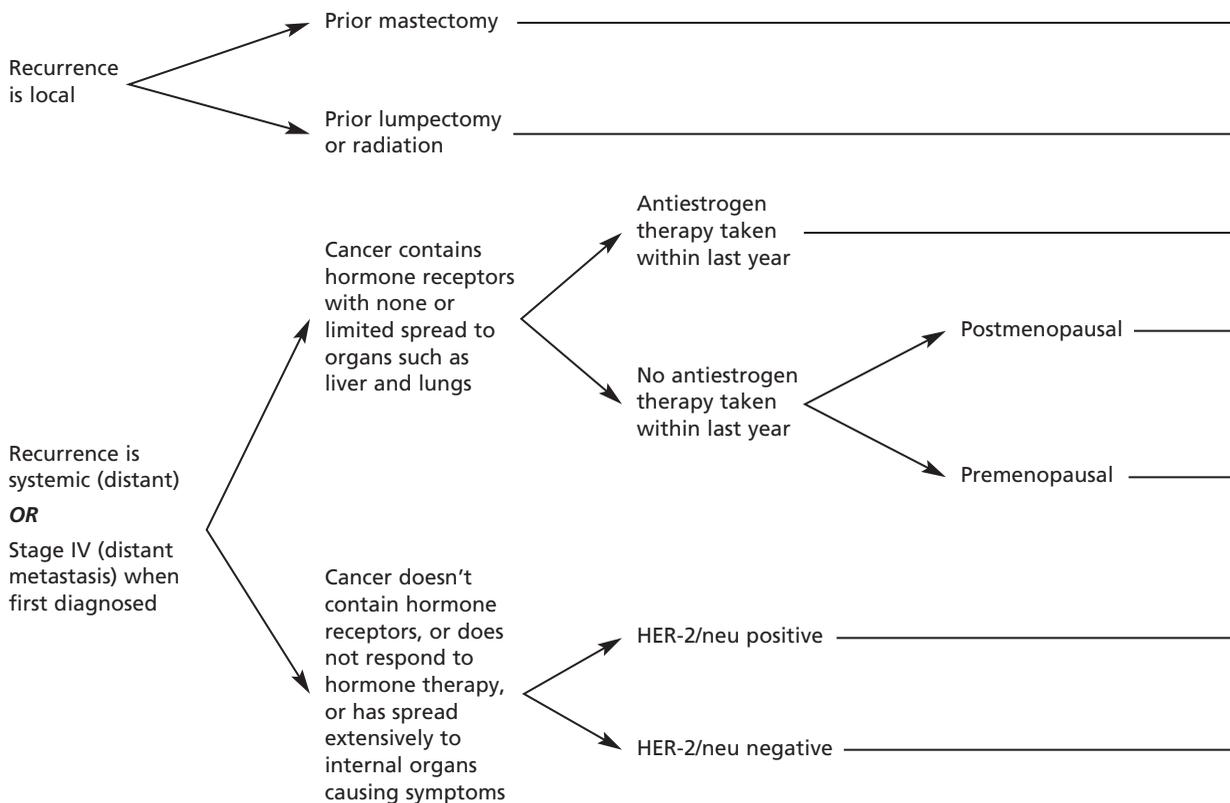
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should have their bones tested for strength using a test called a bone mineral density test.

If there is a suspected recurrence or if the cancer had spread away from the breast when it was diagnosed, the work-up includes:

- complete medical history and physical examination
- blood counts and chemistry tests
- liver function tests
- chest imaging
- bone scan

Recurrence Site

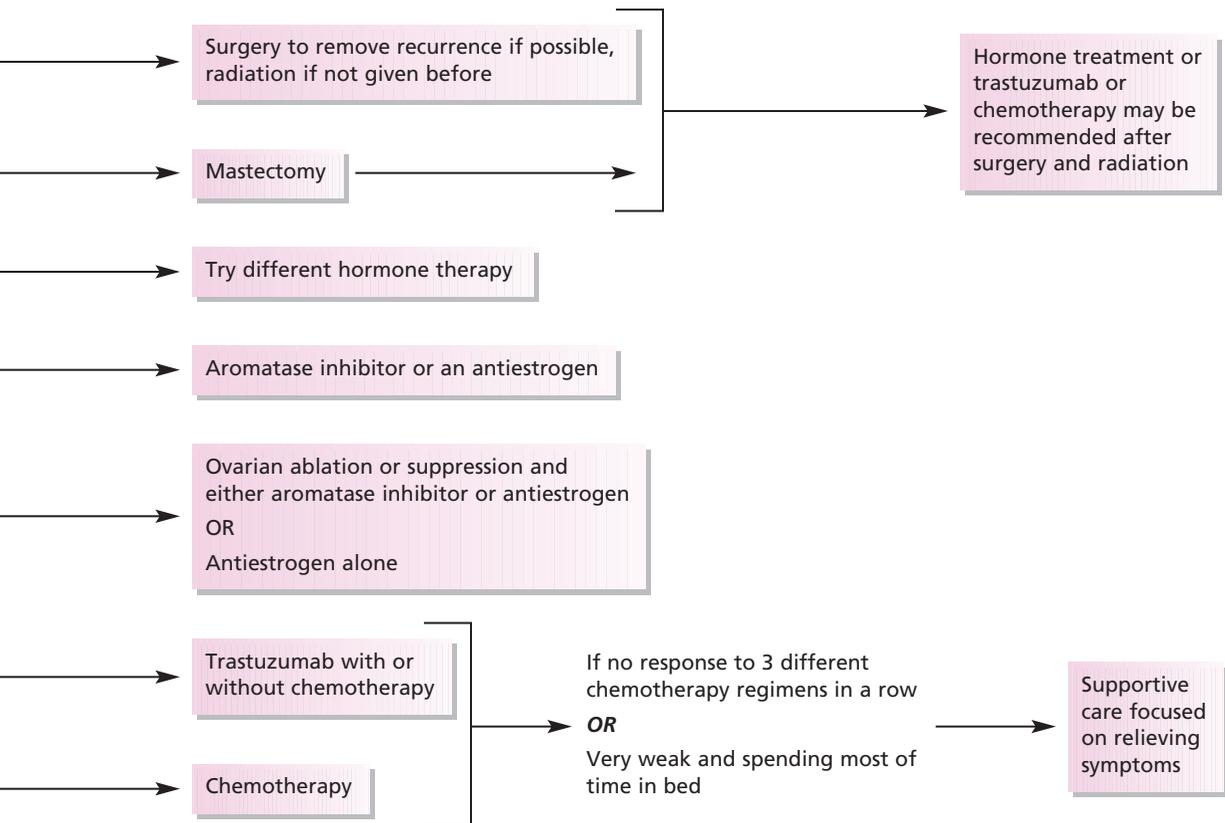


A recurrence may be local, meaning that cancer has returned to the area of the breast, underarm lymph nodes, or nearby tissue. Or it may be systemic, which means that cancer has spread to distant organs. If the recurrence is local and the woman has had a mastectomy, the recurrent cancer should be removed by

surgery (if possible). The area of the recurrence and surrounding tissues should receive radiation therapy, if it has not been given before. If the cancer cannot be removed with surgery, the woman should have radiation therapy if it was not given before. In either case, the NCCN recommends considering

Follow-up and Treatment of Stage IV Disease or Recurrence of Disease (continued)

Treatment of Recurrence or Stage IV



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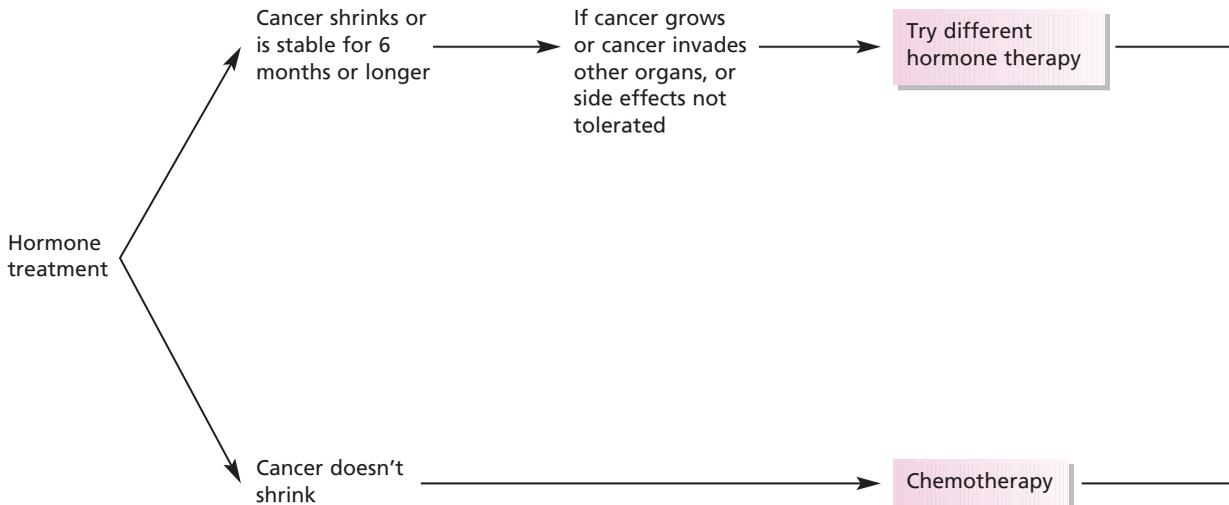
chemotherapy, hormone therapy, or trastuzumab. If the woman was first treated with lumpectomy and radiation and the recurrence is in the breast, a mastectomy should be done, and then chemotherapy, hormone therapy, or trastuzumab therapy should be considered.

If the recurrence is in areas outside the breast or lymph nodes around the breast, or the cancer is first diagnosed as stage IV, the treatment options are based on whether or not the tumor is hormone receptor positive and whether the tumor has limited or extensive spread. Hormone therapy with or without

Primary Treatment

Response

Treatment



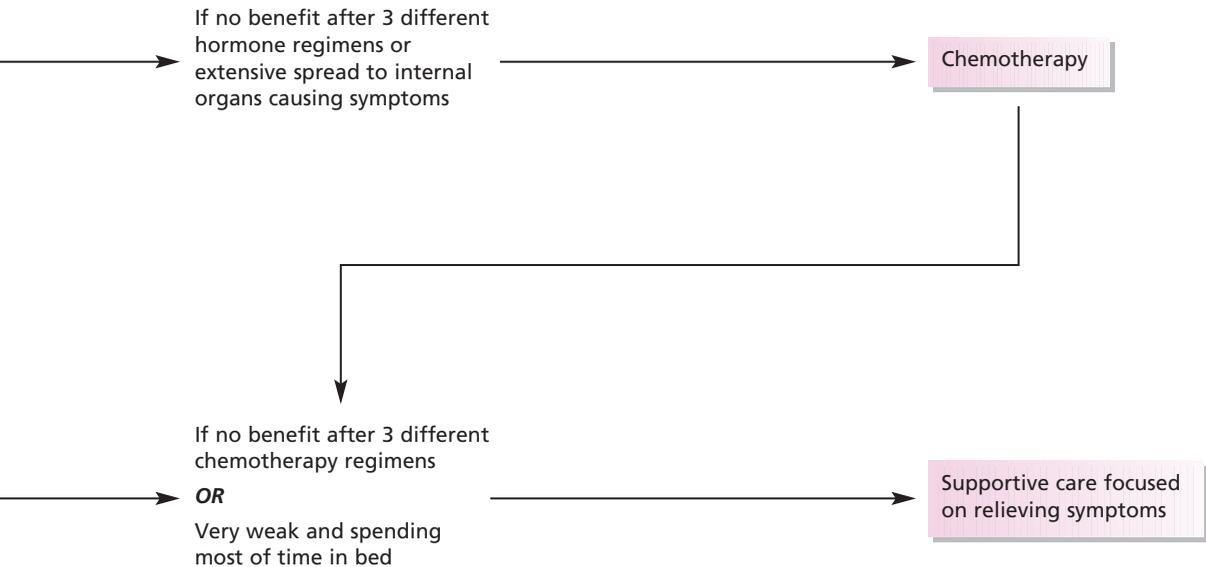
If the hormone therapy causes the cancer to shrink or at least not grow for a while, it would be continued until the cancer begins to grow. At that time another hormone treatment may be tried. The NCCN recommends

trying at least 3 different hormone treatments until there is no longer any benefit or the cancer has spread extensively to internal organs with associated symptoms. At that point chemotherapy is recommended.

Follow-up and Treatment of Stage IV Disease or Recurrence of Disease (continued)

Response

Treatment



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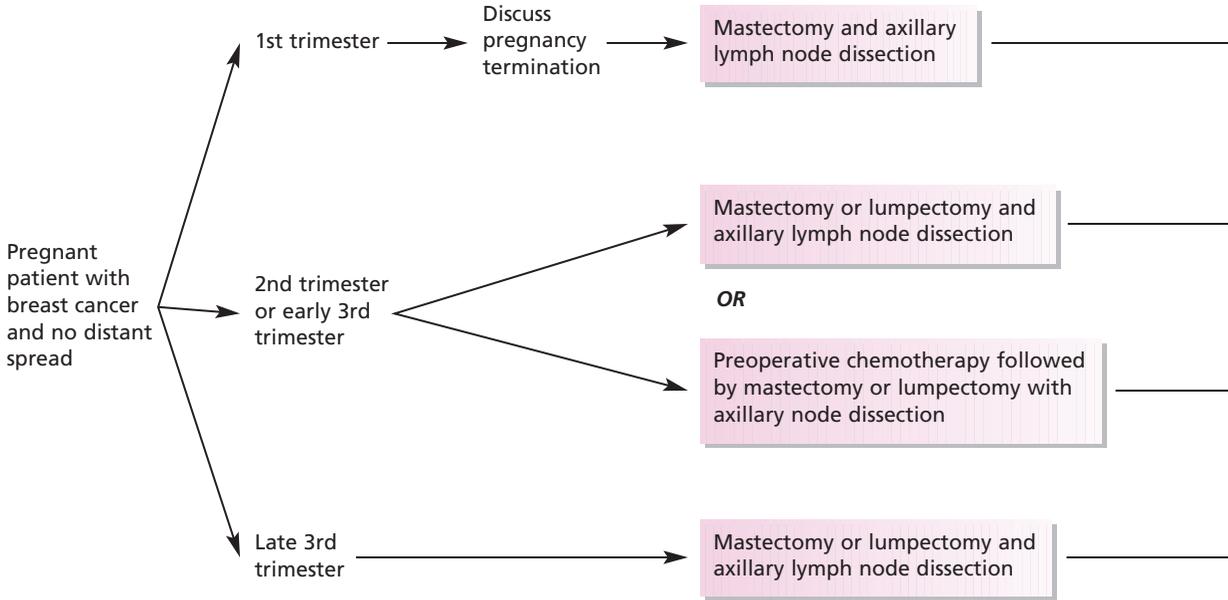
Hormone therapy is not recommended in 3 situations:

- When the tumor is hormone receptor negative; or

- When the tumor has not responded to three prior hormone therapies; or
- When the tumor has spread extensively to organs such as the lungs or liver, and is causing the organs to not work well.

**Clinical
Presentation**

Primary Treatment



Breast Cancer in Pregnancy

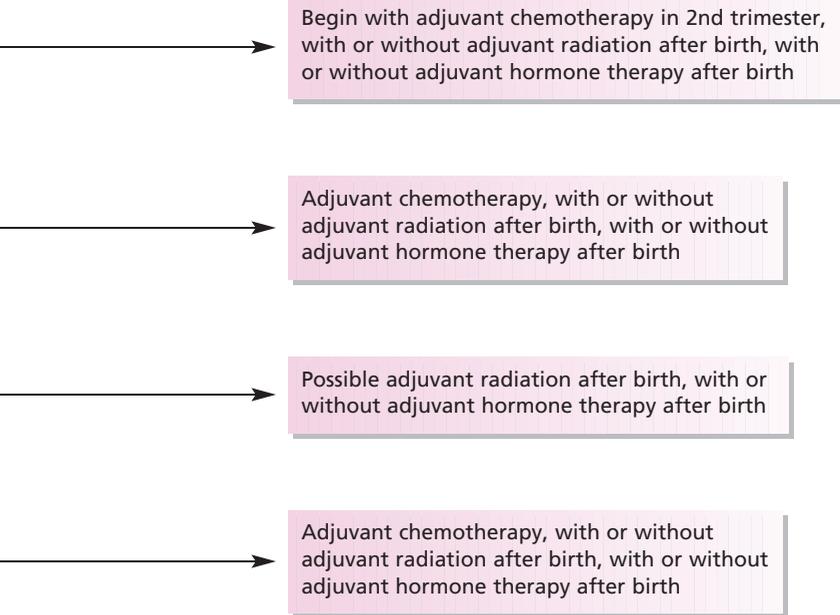
Breast cancer sometimes occurs during pregnancy. In this special situation, it is often necessary to try and find a treatment program that helps the mother, but doesn't hurt the fetus. This is not always possible.

The treatment recommendations depend upon how long the woman has been pregnant. Doctors divide pregnancy into the first 3

months (first trimester), second 3 months (second trimester), and third 3 months (third trimester). Women who are diagnosed with breast cancer during the first trimester should consider the option of having the pregnancy terminated. This is because the use of drug treatments during the early part of pregnancy may cause damage to the fetus. In general, the treatment options for women

Breast Cancer in Pregnancy

Adjuvant Treatment



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who are pregnant are similar to those recommended in non-pregnant woman except that chemotherapy should not be given during the first trimester of pregnancy, some chemotherapies (such as methotrexate) need to be avoided, and radiation therapy should not be administered at any point during pregnancy. For this reason, the radiation therapy that is

part of breast-conserving therapy must be postponed until after the patient has given birth. Hormone therapy should not be started until after the patient has given birth.

It is important that the cancer doctors of a woman who have breast cancer while pregnant communicate and work closely with the woman's obstetrician.

Glossary

Adjuvant therapy

Treatment that is added to increase the effectiveness of a primary therapy. It usually refers to hormonal therapy, chemotherapy, or radiation therapy added after surgery to kill any remaining cancer cells and increase the chances of curing the disease or keeping it in check.

Antiestrogen

A substance that blocks the effects of estrogen on tumors (for example, the drug tamoxifen). Antiestrogens are used to treat breast cancers that depend on estrogen for growth.

Aromatase inhibitors

Drugs that block production of estrogens from hormones made by the adrenal gland. They are used to treat hormone-sensitive breast cancer in postmenopausal women. Examples are anastrozole, letrozole, and exemestane.

Axillary lymph node dissection

A surgical procedure in which the lymph nodes in the armpit (axillary nodes) are removed and examined to find out if breast cancer has spread to those nodes. This is also done to remove any cancerous lymph nodes.

Biopsy

The removal of a sample of tissue to see whether cancer cells are present.

Bisphosphonates

Drugs that help strengthen bones weakened by cancer by encouraging the deposition of

calcium. These include pamidronate and zoledronate.

Breast-conserving treatment or therapy

Surgery to remove a breast cancer and a small amount of benign tissue around the cancer, without removing any other part of the breast. This procedure is also called lumpectomy, segmental excision, or limited breast surgery. The method may require an axillary dissection and usually requires radiation therapy after the surgery.

Breast reconstruction

Surgery that rebuilds the breast contour after mastectomy. A breast implant or the woman's own tissue provides the contour. If desired, the nipple and areola may also be re-created. Reconstruction can be done at same time as the mastectomy or any time later.

Carcinoma in situ

An early stage of cancer, in which the tumor is still only in the structures of the organ where it first developed—the disease does not invade other parts of the organ or spread to distant sites. Most in situ carcinomas are highly curable.

Chemotherapy

Treatment with drugs to destroy cancer cells. Chemotherapy is often used in addition to surgery or radiation to treat cancer when spread (metastasis) is proven or suspected, when the cancer has come back (recurred), or when there is a strong likelihood that the cancer could recur.

Clinical stage

Stage includes evaluation of the size and extent of the cancer, the presence or absence of spread to lymph nodes, and the presence or absence of spread to other body organs. Clinical stage is the stage determined only by physical examination and x-ray or other imaging studies. This includes determination of the size of the cancer and evaluation of lymph nodes by the doctor's examination of the armpit. The final stage is the pathological stage which is determined from microscopic examination of the tumor and lymph nodes. Clinical stage is used for initial treatment planning.

Clinical trial

Research studies test new drugs or treatments and compare them to current, standard treatments. Before a new treatment is used on people, it is studied in the lab. If lab studies suggest the treatment works, it is tested for patients. These human studies are called clinical trials.

Cyst

A fluid-filled mass that is usually not cancer (benign). The fluid can be removed for testing.

Diagnostic mammogram

Screening mammograms are performed on women with no evidence of lumps or other symptoms. This includes 2 x-ray views of each breast (top to bottom; side-to-side). Diagnostic mammograms include additional x-ray views of areas of concern (found on physical examination or on the screening mammogram) to provide more information about the size and character of the abnormality.

Duct

A hollow passage for gland secretions. In the breast, a passage through which milk passes from the lobule (which makes the milk) to the nipple. These ducts are the starting point for most breast cancers.

Ductal carcinoma in situ

The most common type of non-invasive breast cancer. Cancer cells have not spread beyond the ducts.

Estrogen

A female sex hormone produced primarily by the ovaries, and in smaller amounts from hormones produced by the adrenal gland and fat cells. In breast cancer, estrogen may help the growth of breast cancer cells.

Fibroadenoma

A type of benign breast tumor made of fibrous tissue and glandular tissue. On clinical examination or breast self-examination, it usually feels like a firm, round, smooth lump. These usually occur in young women.

Fibrocystic changes

A term that describes certain benign changes in the breast; also called fibrocystic disease. Symptoms of this condition are breast swelling or pain. The breasts often feel lumpy or nodular. Because these signs sometimes mimic breast cancer, a diagnostic mammogram, ultrasound, or even a biopsy may be needed to show that there is no cancer.

Fibrosis

Formation of fibrous (scar-like) tissue. This can occur anywhere in the body.

Fulvestrant

A drug that reduces the number of estrogen receptors.

Grade

Cancer cells are graded by how much they look like normal cells. Grade 1 (also called well-differentiated) means the cancer cells look like the normal cells. Grade 3 (poorly differentiated) cancer cells do not look like normal cells at all. Grade 1 cancers aren't considered aggressive. In other words, they tend to grow more slowly and metastasize slower. Grade 3 cancers are more likely to grow fast and metastasize. A cancer's grade, along with its stage, is used to determine treatment.

HER-2/neu

A gene that produces a type of receptor that helps cells grow. Breast cancer cells with too many HER-2/neu receptors tend to be fast-growing and may respond to treatment with a monoclonal antibody called trastuzumab.

Histology

The way the cancer cells look under the microscope (described as type and arrangement of tumor cells).

Hormone

A chemical substance released into the body by glands, such as the thyroid, pituitary, or ovaries. The substance travels through the bloodstream and sets in motion various body functions. For example, prolactin, which is produced in the pituitary gland, begins and sustains the production of milk in the breast after childbirth.

Hormone receptor

These are the cells' "welcome mat" for hormones circulating in the blood. The receptor is a protein located on a cell's surface (or within the cell cytoplasm) that binds to a hormone. Tumors can be tested for hormone receptors to see if they can be treated with hormones or anti-hormones. See also, *hormone receptor assay*.

Hormone receptor assay

A test to see whether a breast tumor has hormone receptors and is affected by hormones or can be treated with hormones.

Hormone therapy

Can be treatment with hormones, treatment with drugs that interfere with hormone production or hormone action, or surgical removal of hormone-producing glands to kill cancer cells or slow their growth. The most common hormone therapy for breast cancer is the drug tamoxifen. Other hormonal therapies include aromatase inhibitors, androgens and surgical removal of the ovaries (oophorectomy).

In situ

Cancer in situ is localized in its original place and confined to one area. This describes a very early stage of cancer.

Internal mammary lymph nodes

Lymph nodes located inside the chest, next to where the sternum (breastbone) and the ribs come together.

Intraductal papillomas

Small, finger-like, polyp-like, non-cancerous growths in the breast ducts that may cause a bloody nipple discharge. These are most often found in women 45 to 50 years of age. When

many papillomas exist, breast cancer risk is slightly increased.

LHRH (luteinizing hormone-releasing hormone) agonists or antagonists

Drugs that block the ovaries from producing estrogen.

Lobular carcinoma in situ

Also called lobular neoplasia. Non-invasive cancer that has not spread beyond the lobules. The lobules are the milk-producing parts of the breast at the distant end of the ducts.

Lumpectomy

Surgery to remove the breast tumor and a small amount of surrounding normal tissue.

Lymph nodes

Small, bean-shaped collections of immune system tissue located along lymphatic vessels. They remove waste and fluids from lymph and help fight infections. Also called lymph glands.

Lymphedema

A possible complication after breast cancer treatment. Swelling in the arm is caused by excess fluid that collects after lymph nodes and vessels are removed by surgery or treated with radiation.

Magnetic resonance imaging (MRI)

A method of taking pictures of the inside of the body. Instead of using x-rays, MRI uses a powerful magnet and transmits radio waves through the body; the images appear on a computer screen and on film.

Margin

The edge of the tissue removed during surgery. A negative margin is a sign that no cancer was left behind. A positive margin indicates that cancer cells are found at the outer edge

of tissue removed and is usually a sign that some cancer remains in the body.

Mastectomy

Removal of the entire breast. In a simple or total mastectomy surgeons do not cut away any lymph nodes or muscle tissue; in a modified radical mastectomy, surgeons remove the breast and some armpit lymph nodes; in a radical mastectomy (now rarely performed) surgeons remove the breast, armpit lymph nodes, and chest wall muscles under the breast.

Menopause

The time in a woman's life when monthly cycles of menstruation stop forever and the level of hormones produced by the ovaries decreases. Menopause usually naturally occurs in a woman's late 40s or early 50s, but it can also be caused by surgical removal of both ovaries (oophorectomy), or by chemotherapy, which often destroys ovarian function.

Metastasis

The spread of cancer cells to distant areas of the body by way of the lymph system or bloodstream.

Monoclonal antibody therapy

Monoclonal antibodies (MABs) are made in the lab and designed to target specific substances called antigens. MABs which have been attached to chemotherapy drugs or radioactive substances are being studied to see if they can seek out antigens unique to cancer cells and deliver these treatments directly to the cancer, thus killing the cancer cells without harming healthy tissue. Trastuzumab is the MAB used to treat HER-2 positive breast cancers.

Neoadjuvant treatment

Used to describe systemic therapy, such as chemotherapy or hormone therapy, given before surgery. This type of therapy can shrink some tumors, so that they are easier to remove.

Nodal status

Indicates whether a breast cancer has spread (node-positive) or has not spread (node-negative) to lymph nodes in the armpit (axillary nodes). The number and site of positive lymph nodes can help predict the risk of cancer recurrence.

Oophorectomy

Surgery to remove the ovaries.

Ovary

Reproductive organ in the female pelvis. Normally a woman has two ovaries. They contain the eggs (ova) that, when joined with sperm, result in pregnancy. Ovaries produce most of a premenopausal woman's estrogen.

Palpation

Using the hands to examine. A palpable mass in the breast is one that can be felt.

Partial mastectomy

A type of breast-conserving surgery that removes more breast tissue than a lumpectomy (up to one-quarter of the breast). It is also called a segmental mastectomy or a quadrantectomy.

Pathologic stage

Includes the findings of the pathologist after surgery. Most of the time, pathologic stage is the most important stage since involvement of the lymph nodes can only be accurately evaluated by examining them under a microscope.

PET (positron emission tomography) scan

A total body scan that uses a radioactive form of glucose to detect cancer.

Preoperative chemotherapy

Chemotherapy given before surgery to shrink some breast tumors, so they can be removed with less extensive surgery than would otherwise be needed. Also called neoadjuvant chemotherapy.

Progesterone

A female sex hormone released by the ovaries during every menstrual cycle to prepare the uterus for pregnancy and the breasts for milk production (lactation).

Prognosis

A prediction of the course of disease—or the outlook for the cure of the patient. For example, women with breast cancer that is small, does not involve the lymph nodes, and is promptly treated have a good prognosis.

Quadrantectomy

A type of breast-conserving surgery that removes more breast tissue than a lumpectomy (up to one-quarter of the breast). It is also called a partial or segmental mastectomy.

Radiation

Treatment with high-energy rays (or particles) to kill or shrink cancer cells. The radiation may come from outside of the body (external radiation) or from radioactive materials placed directly in the tumor (internal or implant radiation called brachytherapy). Radiation therapy may be used to reduce the size of a cancer before surgery, to destroy any cancer cells left behind after surgery, or, in some cases, as the main treatment.

Segmental mastectomy

A type of breast-conserving surgery that removes more breast tissue than a lumpectomy (up to one-quarter of the breast). It is also called a partial mastectomy or a quadrantectomy.

Sentinel node mapping and biopsy

In a sentinel lymph node mapping and biopsy, the surgeon injects a radioactive substance and/or a blue dye into the area around the tumor. Lymphatic vessels carry these materials to the sentinel lymph node (also called the sentinel node). The doctor can see the blue dye or detect the radioactivity (with a Geiger counter) in the sentinel node, which is cut out and examined. If the sentinel node contains cancer, more axillary lymph nodes are removed. But if it is free of cancer, the patient can avoid additional axillary surgery and its potential side effects.

Side effects

Unwanted effects of treatment, such as hair loss caused by chemotherapy or fatigue caused by radiation therapy.

Sonogram

During an ultrasound the computer transforms the echoes into a picture called a sonogram. See *ultrasound*.

Stage

A method of describing the size and location of cancer based upon characteristics of the tumor, the lymph nodes, and whether there is involvement of other organs.

Stereotactic needle biopsy

A method of needle biopsy that is useful in some cases in which calcifications or a mass can be seen on mammogram, but cannot be

located by touch. Computerized equipment maps the location of the mass and this is used as a guide to place the needle.

Supportive care

Measures taken to relieve symptoms and improve quality of life, but that are not expected to destroy the cancer. Pain medication is an example of supportive care.

Supraclavicular lymph nodes

Lymph nodes located in the area just above the collarbone.

Systemic therapy

Treatment that reaches and affects cells throughout the body; for example, chemotherapy.

Tamoxifen

This antiestrogen drug blocks the effects of estrogen on many organs, such as the breast. Blocking estrogen is desirable in some cases of breast cancer because estrogen promotes their growth. Recent research suggests that tamoxifen may lower the risk of developing breast cancer in women with certain risk factors.

Toremifene

Another antiestrogen drug, similar to tamoxifen.

Ultrasound

High frequency sound waves used to produce images of the breast. See *sonogram*.

For a more comprehensive glossary, you may visit the American Cancer Society Web site at www.cancer.org

The Breast Cancer Treatment Guidelines for Patients were developed by a diverse group of experts and were based on the NCCN clinical practice guidelines. These patient guidelines were translated, reviewed, and published with help from the following individuals:

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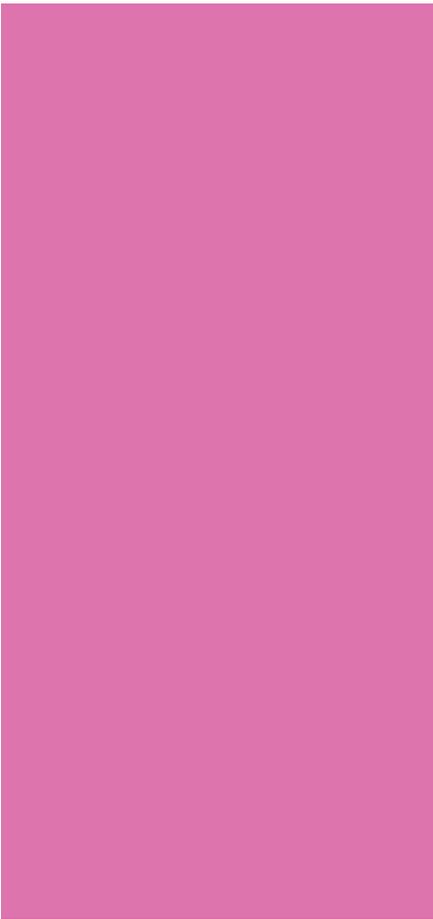
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