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NCCN Guidelines for Patients®

Version 1.2014

Stages I and II Breast Cancer



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Stages I and II Breast Cancer

Breast cancer is the most common type of cancer in women. Learning that you are at risk for or have breast cancer can feel overwhelming. The goal of this book is to help you get the best care. It presents which cancer tests and treatments are recommended by experts for stages I and II breast cancer.

The National Comprehensive Cancer Network® (NCCN®) is a not-for-profit alliance of 25 of the world's leading cancer centers. Experts from NCCN® have written treatment guidelines for doctors who treat stages I and II breast cancer. These treatment guidelines suggest what the best practice is for cancer care. The information in this patient book is based on the guidelines written for doctors.

This book focuses on stages I and II breast cancer. NCCN also offers patient books on colon cancer, lung cancer, melanoma, and many other cancer types. Visit NCCN.org/patients for the full library of patient books as well as other patient and caregiver resources.

Credits

NCCN® aims to improve the care given to patients with cancer. NCCN staff work with experts to create helpful programs and resources for many stakeholders. Stakeholders include health providers, patients, businesses, and others. One resource is the series of books for patients called the NCCN Patient Guidelines®. Each book presents the best practice for a type of cancer.

The patient books are based on clinical practice guidelines written for cancer doctors. These guidelines are called the NCCN Guidelines®. Clinical practice guidelines list the best health care options for groups of patients. Many doctors use them to help plan cancer treatment for their patients.

Panels of experts create the NCCN Guidelines. Most of the experts are from the 25 NCCN Member Institutions. Panelists may include surgeons, radiation oncologists, medical oncologists, and patient advocates. Recommendations in the NCCN Guidelines are based on clinical trials and the experience of the panelists.

The NCCN Guidelines are updated at least once a year. When funded, the patient books are updated to reflect the most recent version of the NCCN Guidelines for doctors. For more information about the NCCN Guidelines, visit NCCN.org/clinical.asp.

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Who should read this book?

This book is about treatment for stages I and II breast cancer among women. Patients and those who support them—caregivers, family, and friends—may find this book helpful. It may help you discuss and decide with doctors what care is best. As you read through this book, you may find it helpful to create a list of questions to ask your doctors.

Where should I start reading?

Starting with Part 1 may be helpful for many people. It explains what stages I and II breast cancer is. Part 2 lists the recommended tests that help doctors plan treatment.

Clinical trials are the preferred treatment option for breast cancer. They are explained at the end of Part 2. Parts 3 through 8 are a step-by-step guide to other treatment options that are based on the best science that exists for stages I and II breast cancer. If you choose not to join a clinical trial, these chapters have specific recommendations. Part 9 offers some helpful tips on getting the best care.

Does the whole book apply to me?

There is important information in this booklet for many situations. Thus, you will likely not get every test and treatment listed. Your treatment team can point out what applies to you and give you more information.

The recommendations in this book include what NCCN experts feel is the most useful based on science and their experience. However, these recommendations may not be right for you. Your doctors may suggest other tests or treatments based on your health and other factors. If your treatment team suggests other tests or treatments, feel free to ask them why.

Making sense of medical terms

In this book, many medical words are included that describe cancer, tests, and treatments. These are words that you will likely hear from your treatment team. Most of the information may be new to you, and it may be a lot to learn.

Don't be discouraged as you read. Keep reading and review the information. Don't be shy to ask your treatment team to explain a word or phrase that you do not understand.

Words that you may not know are defined in the text or in the *Dictionary*. Words in the *Dictionary* are underlined when first used on a page.

Acronyms are also defined when first used and in the *Glossary*. Acronyms are words formed from the first letters of other words. One example is MRI for magnetic resonance imaging.

Breast cancer basics



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6 Women's breasts

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8 Review



You've learned that you have breast cancer. It's common to feel shocked and confused. Part 1 reviews some basics about breast cancer that may help you start to cope. These basics may also help you start planning for treatment.

Among girls, increases in female hormones during puberty cause their breasts to change. The stroma increases, the ducts grow and branch out like tree limbs, and lobules form at the ends of the ducts like leaves at the ends of twigs. Lobules are small sacs that make breast milk after a baby is born. Breast milk drains from the millions of leaf-like lobules into the milk ducts that connect to the nipple. **See Figure 1** for a look inside women's breasts.

Women's breasts

A look inside

Before puberty, breasts have a ring of darker skin called the areola. In the middle of the areola is the raised tip of the breast called the nipple. Under the nipple, small milk ducts branch into fatty tissue like early growth from a seedling. These immature ducts are supported by connective tissue called stroma.

Breast cancer

Uncontrolled cell growth

Breast cancer is a disease of cells—the building blocks of tissue in the body. Almost all breast cancers are carcinomas. Carcinomas are cancers that start in cells that line the inner (ducts, lungs, or gut) or outer (skin) surfaces of the body. In the breast, carcinomas start in the cells lining either the ducts or lobules, but most breast cancers start in ductal cells.

Cells have a control center called the nucleus. The nucleus contains special molecules called chromosomes. Within chromosomes are coded instructions, called genes, for building new cells and controlling how cells behave. Changes in genes, called mutations, cause normal breast cells to become cancer cells. Cancer cells don't behave like normal cells in three key ways.

First, the changes in genes cause cancer cells to make too many copies of themselves. Normal cells divide and multiply when new cells are needed, but otherwise live in a resting state. Normal cells also die when old or damaged. In contrast, cancer cells make new cells that aren't needed and don't die quickly when old or damaged. Over time, cancer cells form a mass called the primary tumor.

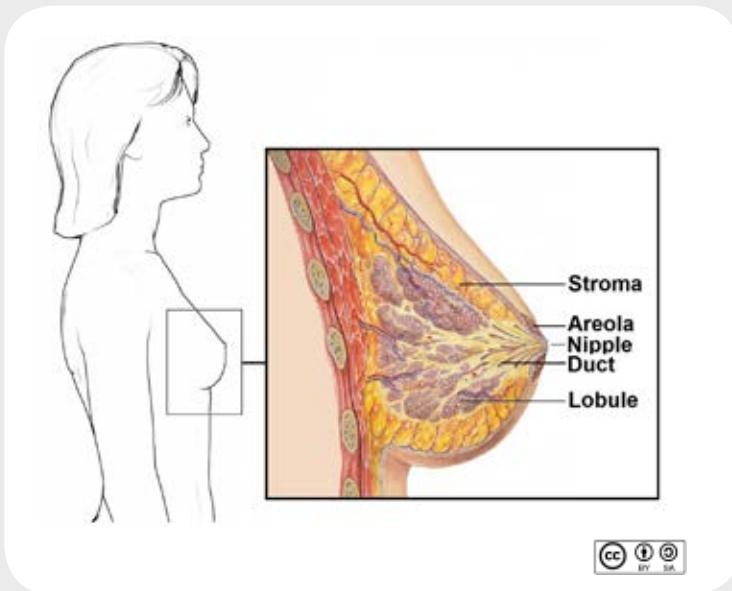
The second way cancer cells differ from normal cells is that they can grow into surrounding tissues.

If not treated, the primary tumor can extend beyond the walls of lobules or ducts into the stroma. Breast cancers that have grown into the stroma, such as stages I and II, are called "invasive."

Third, unlike normal cells, cancer cells can break off from the primary tumor and form secondary tumors. Secondary tumors may form in the breast or in other parts of the body. Breast cancer can spread to other body parts through blood or lymph vessels that are in the stroma.

Most often, breast cancer spreads through lymph. Lymph is a clear fluid that gives cells water and food. It also has white blood cells that fight germs. Lymph nodes filter lymph and remove the germs. Most of the lymph in the breast drains to the axillary lymph nodes found inside the armpit. **See Figure 2.** Once in the axillary nodes, cancer cells can multiply and form secondary tumors.

Figure 1. Parts of the breast



Derivative work of Breast Anatomy by Patrick J. Lynch and C. Carl Jaffe, MD, available at commons.wikimedia.org/wiki/File:Breast_anatomy_normal_scheme.png under a Creative Commons Attribution 3.0 Unported license.

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Figure 2. Axillary lymph nodes



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Stages I and II breast cancer

Growth into the stroma

Cancer staging is a rating by your doctors of the extent of the cancer. It is used to plan which tests may be needed and which treatments are best for you. The AJCC (American Joint Committee on Cancer) staging system is used to stage breast cancer.

Rating of the cancer stage is often done twice. The first rating is based on tests before treatment and is called the clinical stage. Exactly how far the cancer has spread and how many axillary lymph nodes have cancer isn't known until after surgery. Thus, your doctors will rate the cancer again. This rating is called the pathologic stage.

The focus of this book is on stages I and II breast cancer. These breast cancers have grown into the stroma but not into the breast skin or chest wall. The cancer hasn't spread to distant sites.

Stage I. These breast tumors are 2 cm (**centimeters**) or smaller in size. There are no signs of cancer in any lymph nodes before surgery.

Stage IIA. These breast tumors are no larger than 2 cm or no breast tumor has been found. However, there are signs of cancer growth in the axillary lymph nodes, but these nodes haven't grown together or into other tissues. Other stage IIA breast cancers include tumors that are larger than 2 cm but no larger than 5 cm with no signs of cancer in lymph nodes.

Stage IIB. These breast tumors are larger than 2 cm but no larger than 5 cm. There are signs of cancer growth in the axillary lymph nodes, but these nodes haven't grown together or into other tissues. Other stage IIB cancers include breast tumors that are larger than 5 cm with no signs of cancer in any nodes.

Review

- Inside of women's breasts are milk ducts, lobules that can make milk, and fatty tissue called stroma.
- Breast cancer often starts in the milk ducts or lobules and then spreads into the stroma.
- Breast cancer can spread outside the breast through lymph or blood.
- Stages I and II breast cancer have grown into the stroma but not into the breast skin or chest wall.

Treatment planning



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You've learned that you have breast cancer. The next step is to plan the best treatment. Your doctors will choose which treatments you should have based on the cancer, your overall health, and other factors. Part 2 describes the recommended tests for clinical stage I or II breast cancer.

General health tests

Q&A plus body check

Medical history

Your medical history includes any health events in your life and any medications you've taken. Your doctors will ask about all your illnesses, breast biopsies, any prior radiation therapy, and if you are pregnant. It may help to make a list of old and new medications while at home to bring to your doctor's office. Since breast cancer and other health conditions can run in families, your doctors will ask about the medical history of your relatives.

Physical exam

A physical exam is a review of your body for signs of disease. During this exam, your doctor will listen to your lungs, heart, and gut. He or she will also look at and touch your breasts and nearby lymph nodes to

see if they feel normal. Your breasts may be felt while you sit or stand up as well as when you recline. This is called a CBE (**c**linical **breast **e**xam). Besides your breasts, other parts of your body will be felt to see if organs are of normal size, are soft or hard, or cause pain when touched.**

Blood tests

Looking for signs of disease

Doctors test blood to look for signs of disease. Blood is often removed from a vein in the inside of the elbow by a needle. The needle may bruise your skin and you may feel dizzy from the blood draw. Your blood will be sent to a lab for testing.

CBC test

A CBC (complete blood count) measures the number of white blood cells, red blood cells, and platelets. It is important to know if you have enough red blood cells to carry oxygen to your tissues, white blood cells to fight infections, and platelets to clot blood in open wounds. Your blood counts may be low because the cancer has spread into your bones or because of another health problem.

Liver function tests

Your liver is an organ in the upper right side of your abdomen. It does many important jobs, such as remove toxins from your blood. Liver function tests assess for chemicals that are made or processed by the liver. Levels that are too high or low may signal that the cancer has spread to the liver. One such chemical is ALP (**alkaline phosphatase**). High levels of ALP may mean that the cancer has spread to the bone or liver.

Imaging tests

Seeing inside of your body

Imaging tests make pictures of the insides of your body. The pictures can show how far the cancer has spread. Getting an imaging test is often easy. Depending on the test, you may need to stop taking some medicines, stop eating and drinking for a few hours, and remove metal objects from your body.

Breast imaging

Diagnostic bilateral mammography

Mammography uses x-rays to make pictures of the insides of the breast. These pictures are called mammograms. A bilateral mammography takes pictures of both breasts. Mammography that is used for breast cancer screening often takes two pictures

of each breast. Diagnostic mammography may take more pictures from different angles. Diagnostic bilateral mammography is recommended to see the size of the breast tumor and if there are other abnormal areas in either breast.

Before mammography, wash off any deodorant, perfume, powder, or lotion on your breasts and armpits. These products can block pictures. You will also need to remove your top and bra.

In the exam room, a technician will tell you how to place your body next to the machine. As shown in **Figure 3**, your breast will be placed onto a flat metal surface, called a plate. A second plate will be lowered onto your breast to flatten it. This may be painful but is important to do to get the least fuzzy image of the

Figure 3. Mammography

Mammography uses x-rays to make pictures of the insides of the breast. These pictures are called mammograms. Diagnostic bilateral mammography is recommended to see the size of the breast tumor and if there are other abnormal areas in either breast.



breast tissues. Your breast will remain flattened for a few minutes while pictures are taken from a camera that is attached to the two plates. The pictures will be printed on film or saved on a computer. An expert in mammography, called a radiologist, will view the pictures. He or she will report the test findings to your doctors. If the mammograms aren't clear, the next two imaging tests may be used.

Ultrasound

Ultrasound is a test that uses sound waves to make pictures. For this test, you will need to lie down on a table. Next, a technician or doctor will hold the ultrasound probe on top of your breast. The probe may also be placed below your armpit to view your lymph nodes. Ultrasound isn't commonly used for breast cancer but may be used when mammograms are unclear.

Breast MRI

If the mammography and ultrasound images are unclear, your doctors may want you to get a breast MRI (magnetic resonance imaging). This test uses radio waves and powerful magnets to make pictures. Before the test, a contrast dye that makes the pictures clearer may be injected into your vein. The dye may cause you to feel flushed or get hives. Rarely, serious allergic reactions occur. Tell your doctors if you have had bad reactions before.

For a breast MRI, you must remove your top and bra and lie face down on a table. The table has padded openings for your breasts. In the openings, there are coils that help to make pictures. During a breast MRI, the table moves slowly through the tunnel of the MRI machine.

Other imaging tests

Besides your breasts, imaging tests can be used to view other body parts. Your doctors may want you to have more imaging tests based on your symptoms or other test results. Possible other imaging tests include:

Bone scan

A bone scan is recommended if you have bone pain or if ALP blood levels are high. Before the pictures are taken, a radiotracer will be injected into your vein. The most common radiotracer used for bone scans is technetium. You will need to wait about 3 hours for the radiotracer to enter your bones. A special camera is used to take pictures while you lie still on a table. It takes 45 to 60 minutes to complete the pictures. Areas of bone damage use more radiotracer than healthy bone and thus appear as bright spots. Bone damage can be caused by cancer as well as other health problems.

Chest diagnostic CT

CT (computed tomography) takes many x-rays from different angles to make detailed pictures. You may get a CT scan of your chest if you have symptoms of lung disease. The CT scan can help show if the symptoms are caused by cancer or another health problem. Like a breast MRI, a contrast dye may be used. For the CT scan, you will need to lie face up on a table that moves through the machine.

Abdominal/pelvic diagnostic scans

CT and MRI scans can be used to see the insides of your abdomen and pelvis. If you have symptoms in these areas, a scan can help show if the symptoms are caused by cancer or another health problem. Your doctors may also order a scan of these areas if the physical exam, ALP blood test, or liver functioning tests suggest a health problem.



Pathology report

A pathologist is a doctor who's an expert in testing cells to find diseases. This doctor confirms that cancer is present by viewing a sample of cells with a microscope. When cancer is found, he or she will do other tests, such as those described in *Cancer cell tests*, to learn more about the cancer. All lab results are included in a pathology report that gets sent to your doctors.

Some women get more than one pathology report. The first report may include the test results of a breast biopsy. A biopsy removes tissue or fluid samples from the breast with a needle, probe, or surgical knife. Other pathology reports may include test results of breast tissue removed during surgical treatment.

It's a good idea to ask for a copy of your pathology reports. Also ask your treatment team any questions about the test results. These reports are used to plan treatment.

Cancer cell tests

Measuring cell features

Not all breast cancer cells are alike. Cancer cells can differ by the type of receptors they have. A receptor is a protein found in the membrane of cells or inside of cells. Substances bind to the receptors and start changes within the cell. The two types of receptors important for treatment planning are:

Hormone receptor test

Estrogen and progesterone are hormones that increase during puberty in girls causing their breasts to grow. For some breast cancers, the cancer cells have a high number of hormone receptors. When hormones attach to the receptors, the cancer cells grow and divide forming new cancer cells.

Testing for hormone receptors is important because there are drugs that stop hormones from causing cancer growth. IHC (immunohistochemistry) is the lab test that most pathologists use to see if cancer cells have hormone receptors. The cancer cells are stained to see the number of cells with hormone receptors. If at least 1 out of every 100 cancer cells stains positive, the cancer is called hormone receptor-positive. If fewer cancer cells stain positive for hormone receptors, the cancer is called hormone receptor-negative.

HER2 receptor tests

In normal breast cells, there are two copies of the gene that makes HER2 (human epidermal growth factor receptor 2). HER2 is found within the membrane of cells. This type of receptor is called a surface receptor. When HER2 is activated, it causes breast cancer cells to grow and divide. Some breast

cancers have cells with more than two copies of the HER2 gene causing too many HER2 receptors to be made. Other breast cancers have cells with only two HER2 gene copies but still too many HER2 receptors are made.

With too many HER2 receptors, breast cancer cells grow and divide fast. However, there are drugs to stop these cancer cells from growing. Due to high costs and the side effects of these drugs, it is very important to have tests that correctly show HER2 status. Like for hormone receptors, IHC is used to count the number of HER2 receptors. An IHC score of 3+ means that the cancer cells have many HER2 receptors. Another test of HER2 is ISH (in situ hybridization). ISH counts the number of copies of the HER2 gene. If the cancer cells have too many HER2 genes or receptors, the cancer is called HER2 positive.

Lymph node biopsy

Removing tissue samples

You've learned that you have cancer in your breast, but the cancer may have spread to your lymph nodes. If your lymph nodes feel large upon physical exam or don't look normal in imaging scans, there is a higher chance that cancer is in them. To tell if cancer is present in your nodes, a sample of tissue must be removed. The removal of tissue is called a biopsy. A biopsy is generally a safe test.

Before a biopsy, you may be asked to stop eating, stop taking some medicines, or stop smoking. For a needle biopsy, your doctor will insert a needle through your skin into your lymph node. **See Figure 4** for pictures of needle biopsies. The biopsy samples will be sent to a lab and tested for cancer cells. Further testing of your lymph nodes may be done at the time of surgery even

Figure 4. Lymph node biopsies

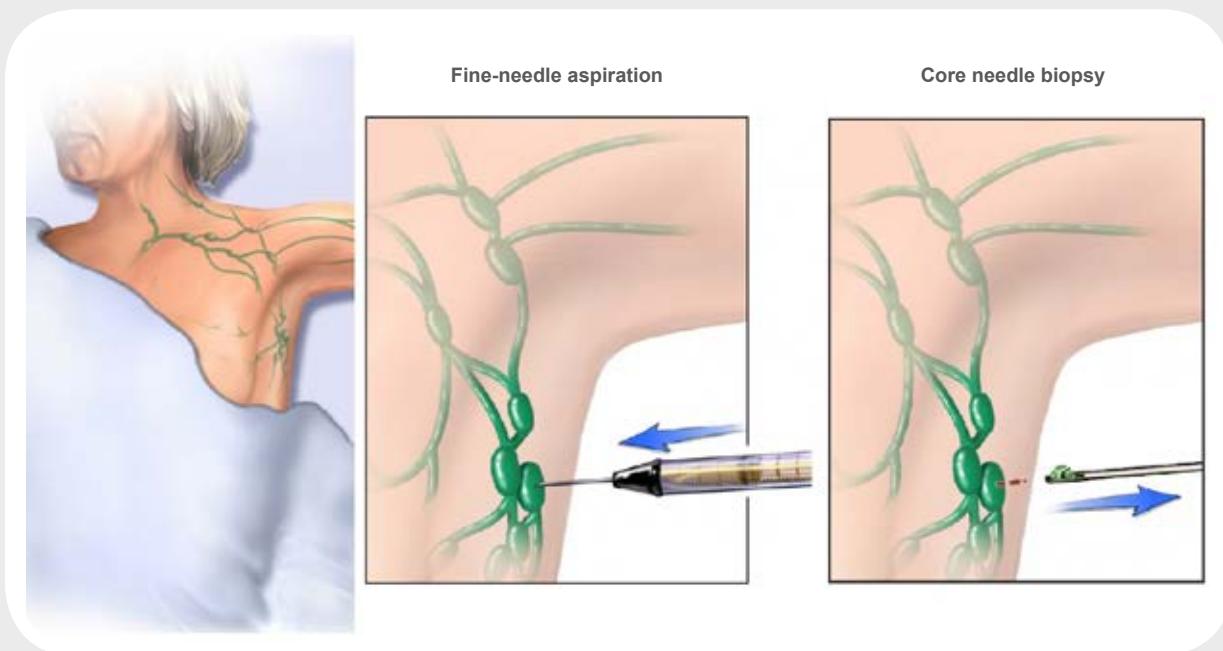


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if the physical exam, imaging tests, and biopsy results are normal. Read page 27 for more information. The two needle biopsies for lymph nodes are:

FNA

An FNA (fine-needle aspiration) uses a very thin needle and syringe to remove a small group of cells from a node. Ultrasound may be used to guide the needle into the node. This biopsy takes a few minutes to complete.

Core needle biopsy

The needle used in a core needle biopsy is able to remove a solid tissue sample. Like FNA, ultrasound may be used to guide the needle into the node. Local anesthesia is given to reduce pain.

Genetic counseling

Assessing for hereditary breast cancer

About 10 out of 100 breast cancers are due to changes in genes that are passed down from a parent to a child. This is called hereditary breast cancer. Using your age, medical history, and family history, your doctor will assess how likely you are to have hereditary breast cancer. If the likelihood is high, you should see a genetic counselor.

A genetic counselor is an expert in changes within genes that are related to disease. The counselor can tell you more about how likely you are to have hereditary breast cancer. He or she may suggest that you undergo genetic testing to look for changes in genes that increase your chances for developing breast cancer.

Hereditary breast cancer is most often caused by mutations in the *BRCA1* and *BRCA2* genes. Normal *BRCA* genes help to prevent tumor growth by fixing damaged cells and helping cells grow normally. Genetic testing can tell if you have a *BRCA* or another mutation. Your test results may be used to guide treatment planning.

Some abnormal changes in genes, called VUS (variants of unknown significance), are not fully understood by doctors. Your doctors may know of research that aims to learn more. If interested, ask your doctors about taking part in such research.

Fertility counseling

Talking about having babies

If you still have menstrual periods, your doctors will have important information to share with you. First, it is important that you not get pregnant during most cancer treatments. Cancer treatments may harm your baby. Your doctors can tell you which birth control methods are best to use while on treatment.

Second, some breast cancer treatments may affect your ability to have babies in the future. If you want the choice of having babies after treatment or are unsure, tell your doctors. After treatment has ended, some women decide they want to have another baby.

If you still have menstrual periods, it may help to talk with a fertility specialist before you begin cancer treatment. A fertility specialist is an expert in helping women get pregnant. The fertility specialist can discuss with you ways to help you have a baby after treatment.



New tests and treatments go through a series of clinical trials to make sure they're safe and work. Without clinical trials, there is no way to know if a test or treatment is safe or helpful.

Clinical trials

Doctors plan treatment based on test results, your overall health, your wishes, and other factors. One option for treatment is joining a clinical trial. Clinical trials are the treatment option that is preferred by NCCN experts. Some basic information about clinical trials is given below.

New tests and treatments aren't offered to the public as soon as they're made. They need to be studied. A clinical trial is a type of research that studies a test or treatment. Clinical trials study how safe and helpful tests and treatments are. When found to be safe and helpful, they may become tomorrow's standard of care. Because of clinical trials, the tests and treatments in this booklet are now widely used to help patients.

Clinical trials have four phases:

Phase I trials	Aim to find the best dose of a new drug with the fewest side effects.
Phase II trials	Assess if a drug works for a specific type of cancer.
Phase III trials	Compare a new drug to the standard treatment.
Phase IV trials	Test new drugs approved by the FDA (Food and Drug Administration) in many patients with different types of cancer.

Joining a clinical trial has benefits.

First, you'll have access to the most current cancer care. Second, you will receive the best management of care. Third, the results of your treatment—both good and bad—will be carefully tracked. Fourth, you may help other patients with cancer.

Clinical trials have risks, too.

Like any test or treatment, there may be side effects. Also, new tests or treatments may not help. Another downside may be that paperwork or more trips to the hospital are needed.

To join a clinical trial, you must meet the conditions of the study.

Patients in a clinical trial are often alike in terms of their cancer and general health. This is to know that any progress is because of the treatment and

not because of differences between patients. To join, you'll need to review and sign a paper called an informed consent form. This form describes the study in detail, including the risks and benefits.



Ask your treatment team if there is an open clinical trial that you can join. There may be clinical trials where you're getting treatment or at other treatment centers nearby. You can also find clinical trials through the websites listed in Part 9.

Review

- Physical exams and blood tests look for signs of disease.
 - Imaging tests allow your doctor to see how far the cancer has spread.
 - Testing of hormone and HER2 receptors can help with treatment planning.
 - Genetic counseling may help you decide whether to be tested for hereditary breast cancer.
 - Fertility counseling may help you plan to have a baby when you're done with treatment.
 - Clinical trials give women access to new tests and treatments.
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My notes

Breast Surgery and Reconstruction



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Local treatments target cancer in one area of the body. Surgery is a local treatment for breast cancer. Part 3 describes the types of surgery used for clinical stages I and II breast cancer and the deciding factors doctors use to plan who may have which surgery. Also, the recommendations for breast reconstruction are presented.

Surgeries of breast tumors

Removing breast tumors

Lumpectomy and mastectomy are two surgeries that remove cancer in the breast. Lumpectomy removes the breast tumor and some normal tissue around the edge of the tumor. This normal tissue is called the surgical margin. A mastectomy removes either a large part of or the whole breast. Before either surgery, you will be asked to stop eating, drinking, and taking some medicines for a short period of time. If you smoke, it is important to stop to get the best treatment results.

Lumpectomy

Before the lumpectomy, you will be given local or general anesthesia. As shown in **Figure 5**, the tumor is often removed through a C-shaped cut into the breast. This cut allows the breast to heal faster. A lumpectomy is usually finished within 15 to 40 minutes. Afterward, a tube may be placed in your breast to drain fluid.

The tissue from the lumpectomy will be tested by a pathologist for cancer cells. It will also be tested to see if cancer cells extend to the edge of the surgical margin. You also may be given another mammography to look for any cancer that wasn't removed. If it appears that cancer remains in your breast, more surgery is needed. The second surgery is often another lumpectomy but sometimes a mastectomy is needed.

Total mastectomy

There are many types of mastectomy. For stages I and II breast cancer, a total (also called simple) mastectomy is recommended. This surgery removes the whole breast but doesn't remove the chest muscles under the breast. A total mastectomy is done under general anesthesia. Often, a surgeon makes an oval-shaped cut around the nipple as shown in **Figure 6**. Next, the breast tissue is detached from the skin and muscle so it can be removed. A total mastectomy is finished within 1 to 2 hours. Afterward, a tube may be placed in your chest to drain fluid.

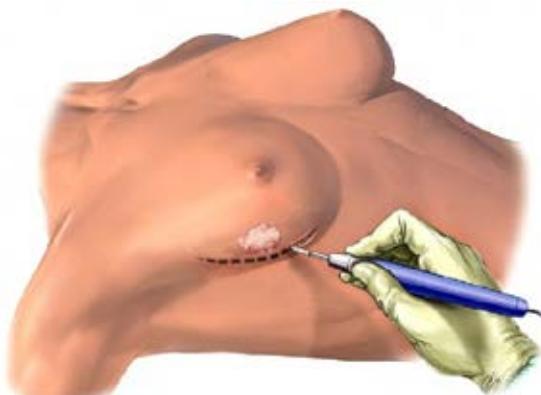


Figure 5. Lumpectomy

For a lumpectomy, a surgeon often makes a C-shaped cut into the breast through which the tissue is removed. This cut allows the tissue to heal faster.

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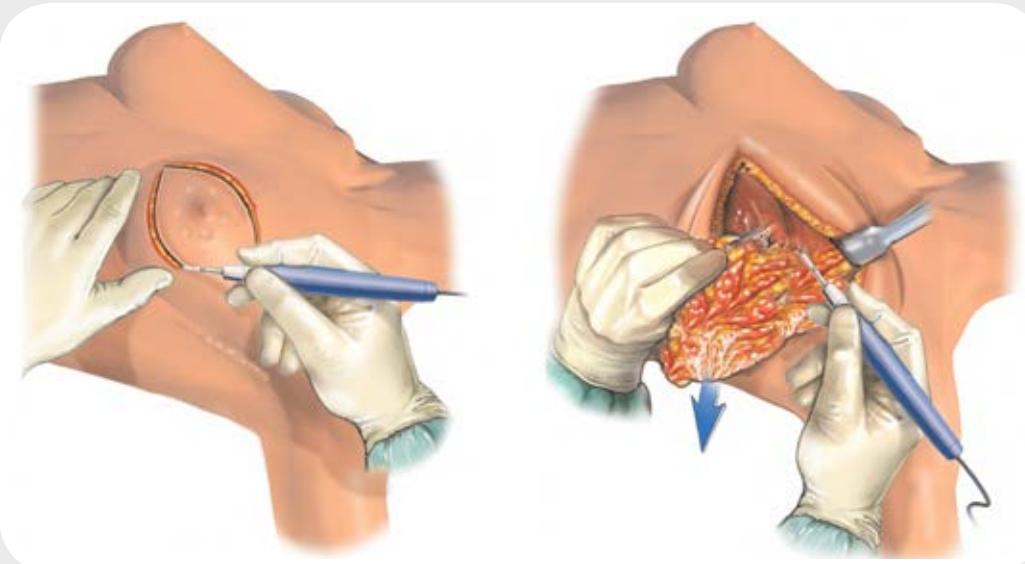


Figure 6. Total mastectomy

For a mastectomy, a surgeon makes an oval-shaped cut around the nipple. Next, the breast tissue is detached from the skin and muscle so it can be removed.

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Which breast surgery can I have?

Deciding factors

A total mastectomy is an option for all women with stages I and II breast cancer who are healthy enough to have surgery. An example is women who have no serious heart problems. In contrast, not all women are able to have a lumpectomy. Radiation therapy is

almost always given after lumpectomy. This combined treatment is called breast-conserving therapy. Breast surgeries are recommended based on the factors in the chart below.

Deciding factors

Can I have a mastectomy?

Yes, if all of these factors describe you

- Have stage I or II breast cancer, AND
- Are healthy enough for surgery.

Can I have breast-conserving therapy?

No, if any of these factors describe you

- Have cancer that needs radiation while you are pregnant,
- Have two or more tumors that can't be removed through one cut,
- Have signs of cancer throughout your breast, OR
- Have had a lumpectomy with many areas of cancer in the surgical margin.

Maybe not, if any of these factors describe you

- Have had prior radiation close to where the cancer is,
- Have a connective tissue disease that affects your skin,
- Have a breast tumor larger than 5 cm,
- Have a surgical margin with one area of cancer, OR
- Are genetically predisposed to breast cancer.

Yes, if all of these factors describe you

- Haven't had radiation close to where the cancer is,
- Can have all cancer removed through one cut,
- Your breast won't be too disfigured afterward,
- Have a cancer-free surgical margin from lumpectomy,
- Have no health conditions that might cause problems, AND
- Aren't genetically predisposed to breast cancer.

Neoadjuvant treatment for large stage II tumors

You may be able to have breast-conserving therapy if you meet all the conditions except for a large stage II breast tumor. A breast tumor is large if it is bigger than 2 cm. If the tumor is large, your doctors may decide that you can receive cancer drugs that may shrink the tumor enough for breast-conserving surgery. Use of cancer drugs for this purpose is called neoadjuvant (or preoperative) treatment.

If you might have neoadjuvant treatment, a core needle biopsy of the breast tumor is needed if not done before. A biopsy can confirm if there's cancer and what type. For this biopsy, a needle will be inserted through your skin and into the tumor to remove a tissue sample. Your doctor will numb the area beforehand and may use an imaging test to help place the needle. When mammography is used to guide the needle, it is called a stereotactic needle biopsy. Ultrasound-guided biopsy uses an ultrasound image.

It is also important for your doctors to know if the cancer has spread to lymph nodes in your armpit (axillary nodes). If the physical exam was normal, an ultrasound of your axillary nodes is recommended. If either the physical exam or ultrasound suggests cancer is present, a biopsy of your axillary nodes is recommended. Read page 15 for information on lymph node biopsies.

Neoadjuvant treatment can cause the tumor to shrink a lot. Thus, it is recommended that you have small clips placed in your breast near the tumor before neoadjuvant treatment. Lymph nodes with possible cancer must also be marked. Imaging tests, such as mammography or ultrasound, should be used to help place the clips. The clips will help your surgeon to find the tumor area and remove tissue after neoadjuvant treatment.

Chemotherapy is the class of drugs most often used to shrink large breast tumors before surgery. If you have HER2-positive breast cancer, you should be treated with chemotherapy and HER2 inhibitors for at least 9 weeks before surgery. These drugs are discussed in Part 4. However, it is ideal that the full dose of chemotherapy be given before surgery. Hormone therapy alone may be used for neoadjuvant treatment but only for some women with hormone receptor-positive cancer. Hormone therapy is discussed in Part 6.

During treatment you will be given tests to assess if the cancer is shrinking. Such tests include a physical exam and possibly imaging tests. If the cancer doesn't shrink much or grows, your doctor may give you a different type of chemotherapy. If the tumor shrinks enough, a lumpectomy can be done.



When you have a choice: Breast conserving therapy vs. total mastectomy

You may be able to have breast-conserving therapy but are thinking about having a mastectomy instead. When deciding which treatment to have, consider all the facts and what you prefer. It's important to know that breast-conserving therapy works as well as a total mastectomy in keeping women alive. Some known pros and cons of each treatment are listed below. Part 9 also lists some decision aids that may be helpful.

Breast-conserving therapy

Pros

1. Natural look of your skin is kept
2. Can feel sensations in your breast since not all breast tissue is removed
3. Quicker healing time after surgery

Total mastectomy

Pros

1. Reconstruct whole breast
2. Although it's no better than breast-conserving therapy, worry about recurrence may be less
3. Less likely to need radiation therapy

Cons

1. Shapes of breasts may not match
2. Weeks of radiation and its side effects
3. Lumpectomy may not remove all DCIS so a second surgery may be needed

vs

Cons

1. Loss of breast
2. Longer healing time after surgery
3. Side effects likely to be more serious than for breast-conserving therapy (eg, more swelling)

Surgeries of lymph nodes

Removing lymph nodes

Most women with stage I or II breast cancer will have some axillary lymph nodes removed. The removed nodes are tested to see if they have cancer cells. Lymph nodes are removed by one or both of these methods:

Sentinel lymph node dissection

If the cancer has spread through lymph, it is likely to be found in your sentinel node(s). A sentinel node is the first lymph node to which lymph travels after leaving the breast. Sometimes, there is more than one sentinel node.

A sentinel lymph node dissection is also called a sentinel lymph node biopsy. For this dissection,

radioactive or colored dye is injected into your breast. The dye follows the path the lymph takes when it leaves your breast. This allows your surgeon to find the sentinel node(s). After the dye marks your sentinel node(s), your surgeon will remove them and sometimes other nearby nodes as well. These nodes will then be sent to a pathologist for testing.

Axillary lymph node dissection

An axillary lymph node dissection removes more lymph nodes than a sentinel lymph node dissection. At least 10 lymph nodes are removed from Level I and II areas. Level I lymph nodes lie below the armpit. Level II nodes are in the armpit. If cancer is found in Level II lymph nodes, nodes from Level III will be removed. Level III nodes are below the collarbone.

Which lymph node surgery should I have?

Deciding factors

Part 2 recommended getting a physical exam and

imaging tests. If these tests do not show cancer in your axillary lymph nodes, a sentinel lymph node dissection is recommended. If you had a lymph node biopsy, described on page 15, a sentinel dissection is also recommended if no cancer is found. A sentinel

Deciding factors

Should I have a sentinel dissection or an axillary dissection?

Maybe neither, if <u>any</u> of these factors describe you	<ul style="list-style-type: none"> Have tubular or mucinous breast cancer, Having lymph node surgery wouldn't affect chemotherapy or hormone therapy decisions, Are of older age, OR Have serious health problems other than cancer
--	---

Should I have a sentinel dissection?

Yes, if <u>any</u> of these factors describe you	<ul style="list-style-type: none"> Had no signs of cancer in your nodes as assessed by physical exam and imaging tests, OR Had a lymph node biopsy that didn't find cancer
--	--

Should I have an axillary dissection?

Maybe, if <u>all</u> of these factors describe you	<ul style="list-style-type: none"> Had a sentinel dissection that found cancer and ALL the following: <ul style="list-style-type: none"> You have cancer in only 1 or 2 nodes, You have a breast tumor no larger than 5 cm, You will have breast-conserving therapy, You will have whole-breast radiation therapy, AND You won't have neoadjuvant chemotherapy
Yes, if <u>any</u> of these factors describe you	<ul style="list-style-type: none"> Had a lymph node biopsy that found cancer, Had a sentinel dissection that didn't find the sentinel node, OR Had a sentinel dissection that found cancer plus one or more of the following: <ul style="list-style-type: none"> You have cancer in 3 or more nodes, You have a tumor larger than 5 cm, You will have a mastectomy, You won't have whole-breast radiation, OR You will have neoadjuvant chemotherapy

dissection is more likely to find cancer, if present, than a physical exam, imaging test, or a lymph node biopsy.

Axillary lymph node dissection is based on the results of the lymph node biopsy or sentinel dissection. If cancer is found by either method, you will likely have a Level I and II axillary dissection. Under very specific conditions an axillary dissection is not done if cancer is found with sentinel dissection. An axillary dissection is also recommended if the sentinel lymph node isn't found during the sentinel dissection. If no cancer is found with a sentinel dissection, an axillary dissection isn't needed.

Lymph node dissections are often done at the time of the breast surgery. During a lumpectomy, lymph nodes are removed through a second surgical cut. During a mastectomy, lymph nodes are removed through the same cut used to remove the breast tumor.

However, neoadjuvant treatment may fully treat cancer that has spread to the axillary lymph nodes. If the cancer is fully treated, your doctors won't know that the cancer has spread if dissection is after neoadjuvant treatment. Knowing if the cancer has spread is important for treatment planning. Thus, a sentinel lymph node dissection may be done before neoadjuvant treatment. After neoadjuvant treatment, which is discussed in Part 4, you may have an axillary lymph node dissection at the time of the breast surgery.

Side effects of cancer surgery

Unhealthy and unpleasant outcomes

Side effects are unhealthy or unpleasant physical or emotional responses to treatment. Common side effects of any surgery are pain, swelling, and scars. Pain and swelling often fade away in the weeks following surgery.

After breast surgery, you may also have a loss of feeling where you had the surgery. A total mastectomy may also cause stiffness, severe tiredness despite sleep, and uncomfortable crawly sensations as your nerves heal. If you receive general anesthesia, it may cause a sore throat, nausea with vomiting, confusion, muscle aches, and itching.

Side effects are more common and severe with axillary lymph node dissection than sentinel lymph node dissection. Lymphedema is the most serious of these side effects and may be permanent. Lymphedema is swelling due to buildup of lymph. It occurs in the arms after node removal. Most women find lymphedema bothersome but not disabling. There is no way to know who will have it or when it will occur. It can happen just after surgery or months to years later.

Not all the side effects of surgery are listed here. Please ask your treatment team for a complete list. If a side effect bothers you, tell your treatment team. There may be ways to help you feel better.

Breast reconstruction

Methods to rebuild breasts

Some women choose to have breast reconstruction after a lumpectomy or mastectomy. Breast reconstruction means putting implants in or moving tissues from other body parts to make a more normal-looking breast mound. Other women use external fake breasts or do nothing. The NCCN recommendations for breast reconstruction are presented next. Talk with your doctor about these options. For more information on breast reconstruction, visit the websites listed in Part 9.

After lumpectomy

Volume displacement

If you will have a lumpectomy, your breast can be re-shaped using volume displacement. Volume displacement is the shifting of the remaining breast tissue so as to fill the hole left by the lumpectomy. Shifting of the breast tissue is often done right after the lumpectomy by the cancer surgeon. If you choose to have volume displacement, a larger piece of breast tissue is removed but this likely reduces your chances of cancer returning in that breast. Another benefit is that the natural look of your breast is kept. If you don't like the results of the volume displacement, having breast revision surgery may help. Breast revision surgery is done by a plastic surgeon. You may have another volume displacement, or you may want to get implants or flaps, which are described below.

After mastectomy

Sparing breast skin

If you will have a total mastectomy, your surgeon may be able to save much of your breast skin. This is called a skin-sparing mastectomy. Only the nipple, areola, and skin near the biopsy site are removed. Surgery that spares the nipple and areola should only be done as part of a clinical trial.

There are benefits to having a skin-sparing mastectomy. The size of the mastectomy scar will be smaller, your breast will have a more natural shape, and you will be able to have the reconstruction right away if you want. To get the best results, your cancer and plastic surgeons need to work well together.

Timing of reconstruction

You can have reconstruction at any time. Reconstruction at the same time as the cancer surgery is called immediate reconstruction. Delayed reconstruction can occur months or years after the cancer surgery.

Types of reconstruction

There are three ways to reconstruct breasts. All involve having plastic surgery. Breast reconstruction is generally safe, but with any surgery, there are risks. Please ask your treatment team for a complete list of the risks. The three ways to reconstruct breasts are:

Implants

Breasts can be reconstructed using breast implants. Breast implants are small bags filled with salt water, silicone gel, or both that are placed under the breast skin and muscle. Implants have a small risk of breaking and leaking. A balloon-like device, called an expander, may first be placed under your skin and inflated to stretch out your muscle and skin and muscle. Every few weeks for two to three months, the expander will be enlarged until the implant will fit in place. You may feel pain from the expander stretching your skin and muscle. In addition, some women will have pain from the implant, scar tissue, or tissue death (necrosis).

Flaps

Another type of reconstruction uses tissue from your body, known as "flaps." Tissue is taken from the belly area, butt, or from under the shoulder blade to form breasts. Some flaps are completely removed from your body then sewn in place. Other flaps stay

attached and then are slid over to the breast area and sewn into place. Women who have diabetes or who smoke are more likely to have problems with flaps than other women. Some risks of flaps are tissue death, lumps from death of fat, and muscle weakness that may cause a hernia.

Implants and flaps

Some breasts are reconstructed with both implants and flaps. Using both types may give the reconstructed breast more volume and help match its shape to the other breast. However, for any

reconstruction, you may need surgery on your real breast so that the two breasts match in size and shape.

Nipple replacement

Like your breast, you can have your nipple remade, use a fake nipple, or do nothing. To rebuild a nipple, tissue from your vulva, thigh, or other nipple is used. You may lose feeling in your real nipple if tissue is removed. Tissue used from other areas of your body to make a nipple can be darkened in color with a tattoo.

Review

- Lumpectomy and total mastectomy are the two surgeries used for stages I and II breast cancer.
- Lumpectomy with radiation therapy is called breast-conserving therapy.
- Some women with large breast cancer may be able to have breast-conserving therapy after receiving neoadjuvant treatment.

- Sentinel lymph node dissection removes the lymph nodes to which lymph first travels after leaving the breast.
- Axillary lymph node dissection removes sentinel lymph nodes and other lymph nodes around the armpit.
- All surgeries have a risk for side effects. Ask your treatment team for a complete list.

My notes

Chemotherapy and HER2 inhibitors



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Some women with stage I or II breast cancer will receive chemotherapy with or without HER2 inhibitors. These drugs may be given before or after surgery.

If given before surgery, they are called neoadjuvant (or preoperative) treatment. Neoadjuvant treatment is discussed on page 25. If given after surgery, they are called adjuvant treatment.

Of importance, you should not have chemotherapy if you are in the first three months of pregnancy. In Part 4, other deciding factors of who should have adjuvant chemotherapy are discussed. Also, the chemotherapy drugs that are recommended for neoadjuvant and adjuvant treatment are listed.

Adjuvant chemotherapy

Chemotherapy after surgery

Chemotherapy is given after surgery to lower the chances of breast cancer returning outside the breast. How likely it is that the cancer will return differs among women. Doctors predict the return of cancer based on features of the cancer and research results. If you had neoadjuvant treatment, complete the full dose if you didn't finish it before surgery. If you did complete the full dose, you may need more chemotherapy after surgery if any cancer left behind grows. Read Parts 5 and 6 next to see if you will need radiation therapy and hormone therapy after completing chemotherapy.

Should I have adjuvant chemotherapy?

Deciding factors

Lower-risk breast cancer

Tubular and mucinous breast cancers are rare subtypes of invasive ductal carcinoma. Tubular breast cancer is so named because the cancer cells look like tubes. Mucinous (or colloid) breast cancer is so named because there's a lot of mucus around

the cancer cells. Both tubular and mucinous breast cancers tend to grow slowly and not spread outside the breast. The recommendations for tubular and mucinous breast cancers are listed below.

Lower-risk breast cancer | Hormone receptor-positive

Size of breast tumor	Size of lymph node tumor	Do I need chemotherapy?
0.5 cm or smaller	None or tiny (≤ 2.0 mm) tumors	No
1.0 to 2.9 cm	None or tiny (≤ 2.0 mm) tumors	No
3.0 cm or larger	None or tiny (≤ 2.0 mm) tumors	No
Any size	Larger than 2.0 mm	Consider chemotherapy

Almost all tubular and mucinous breast cancers are both hormone receptor-positive and HER2-negative. In fact, testing should be repeated if test results show your tumor is hormone receptor-negative or HER2-positive. Should the second tests find the same results, the tubular or mucinous breast cancer

should be treated according to the recommendations for higher-risk breast cancers. When the cancer is hormone receptor-positive, chemotherapy should be considered when there is at least one tumor in your axillary lymph nodes that is 2.0 mm or larger.

Higher-risk breast cancer

Most types of breast cancer are more likely to spread beyond the breast than tubular and mucinous cancers. However, many of the “higher-risk” breast cancers that are found early and treated may be cured. Higher-risk breast cancers include:

- Invasive lobular carcinomas –
Cancers that started in lobular cells,
- Invasive ductal carcinomas –
Cancers that started in ductal cells,
- Metaplastic carcinoma –
Cancer that changed from one cell type to another, and
- Mixed carcinoma –
Cancer that has more than one cell type.

The recommendations for higher-risk breast cancers are listed in the charts on the following pages by hormone and HER2 status.



Higher-risk breast cancer | Hormone receptor-negative and HER2-negative

Size of breast tumor	Size of lymph node tumor	Do I need chemotherapy?
0.5 cm or smaller	No tumors	No
	Tiny (≤ 2.0 mm) tumors	Consider chemotherapy
0.51 to 1.0 cm	None or tiny (≤ 2.0 mm) tumors	Consider chemotherapy
1.0 cm or larger	None or tiny (≤ 2.0 mm) tumors	Yes
Any size	Larger than 2.0 mm	Yes

Chemotherapy isn't recommended if a breast tumor is 0.5 cm or smaller and hasn't spread because the results of local treatment alone are often very good. In contrast, chemotherapy is recommended if a breast tumor is 1.0 cm or larger or at least one lymph node

tumor is larger than 2 mm. For all other tumors, your doctor may want you to have chemotherapy if other features of the cancer suggest that the cancer is likely to return after local treatment.

Higher-risk breast cancer | Hormone receptor–positive and HER2-negative

Size of breast tumor	Size of lymph node tumor	Do I need chemotherapy?
0.5 cm or smaller	No tumors	No
	Tiny (≤ 2.0 mm) tumors	Consider chemotherapy
0.51 cm or larger	None or tiny (≤ 2.0 mm) tumors	Consider chemotherapy if 21-gene RT-PCR not done
		No, if 21-gene RT-PCR score is below 18
		Consider chemotherapy if 21-gene RT-PCR score is 18 to 30
		Yes, if 21-gene RT-PCR score is 31 or higher
Any size	Larger than 2.0 mm	Yes

These recommendations are like those for hormone receptor–negative, HER2-negative breast cancer.

The exception is for breast tumors that are 0.51 cm and larger with no or little cancer growth in the axillary lymph nodes. In this case, the 21-gene RT-PCR (reverse transcriptase-polymerase chain reaction) test can be used to help decide if chemotherapy would be helpful. 21-gene RT-PCR looks at the

activity of 21 genes to assess how likely it is that the cancer would return after local treatment. Test scores range from 0 to 100. Chemotherapy should be considered if the test isn't done. A score below 18 means you can safely skip chemotherapy. A score of 18 to 30 means chemotherapy may be helpful. Scores of 31 and above suggest that chemotherapy would help stop the return of breast cancer.

Higher-risk breast cancer | Hormone receptor-negative and HER2-positive

Size of breast tumor	Size of lymph node tumor	Do I need chemotherapy?
0.5 cm or smaller	No tumors	No
	Tiny (≤ 2.0 mm) tumors	Consider chemotherapy with trastuzumab
0.51 to 1.0 cm	None or tiny (≤ 2.0 mm) tumors	Consider chemotherapy with trastuzumab
1.0 cm or larger	None or tiny (≤ 2.0 mm) tumors	Yes, with trastuzumab
Any size	Larger than 2.0 mm	Yes, with trastuzumab

Adjuvant treatment isn't recommended if a breast tumor is 0.5 cm or smaller and hasn't spread, because the results of local treatment alone are often very good. In contrast, chemotherapy with trastuzumab is recommended for breast tumors 1.0 cm or larger or at least one lymph node tumor

is larger than 2 mm. For all other tumors, your doctor may want you to have chemotherapy with trastuzumab if other features of the cancer suggest that the cancer is likely to return after local treatment alone.

Higher-risk breast cancer | Hormone receptor-positive, HER2-positive

Size of breast tumor	Size of lymph node tumor	Do I need chemotherapy?
0.5 cm or smaller	No tumors	No
	Tiny (≤ 2.0 mm) tumors	Chemotherapy with trastuzumab is an option
0.51 to 1.0 cm	None or tiny (≤ 2.0 mm) tumors	Consider chemotherapy with trastuzumab
1.0 cm or larger	None or tiny (≤ 2.0 mm) tumors	Yes, with trastuzumab
Any size	Larger than 2.0 mm	Yes, with trastuzumab

Chemotherapy isn't recommended when a breast tumor is 0.5 cm or smaller and hasn't spread, because the results of local treatment alone are often very good. If a tumor this size has spread to the lymph nodes, chemotherapy with trastuzumab is an option. Chemotherapy with trastuzumab may be given if a breast tumor is larger than 0.5 cm but smaller than

1.0 cm and there is no or little spread to the lymph nodes. It depends on if other features of the cancer suggest that the cancer is likely to return. In contrast, chemotherapy with trastuzumab is recommended for breast tumors 1.0 cm or larger or at least one lymph node tumor is larger than 2 mm.

Chemotherapy regimens

Recommended drugs for before or after surgery

Some chemotherapy drugs kill cancer cells by damaging their DNA (deoxyribonucleic acid) or disrupting the making of DNA. Other drugs interfere with cell parts that are needed for making new cells.

Many chemotherapy drugs work when cells are in an active growth phase. During the active growth phase, cells grow and divide to form a new cell. Chemotherapy drugs that disrupt the growth phase work well for cancer cells that are growing and dividing quickly. Other chemotherapy drugs work whether cells are in a growth or resting phase.

HER2 inhibitors used for stages I and II breast cancer include trastuzumab (Herceptin®) and pertuzumab (Perjeta®). HER2 inhibitors are taken with chemotherapy if the cancer is HER2 positive. They are a type of targeted therapy.

Targeted therapy stops the action of molecules that start the growth of cancer cells. Trastuzumab works by attaching to HER2 receptors—like a key into a lock—to stop the start of cell growth. Pertuzumab works like trastuzumab but attaches to a different part of the receptor. These two drugs also attract immune cells that help to kill the cancer cells.

Chemotherapy drugs differ in the way they work, so often more than one drug is used. A combination regimen is the use of two or more chemotherapy drugs. Chemotherapy is given in cycles of treatment days followed by days of rest. Giving chemotherapy in cycles gives your body a chance to recover after receiving chemotherapy. The cycles vary in length depending on which drugs are used.

The recommended regimens for HER2-negative and positive tumors are listed in the charts on the following pages. They are divided by “preferred” and “other” regimens by NCCN experts based on how well they work, side effects, and treatment schedules. Some regimens are only used in very specific circumstances. Please talk with your doctor about which regimen is best for you.



Preferred chemotherapy regimens | HER2-negative tumors

Preferred Regimen	Schedule	Total time
Dose-dense AC then paclitaxel	Four 14-day cycles Four 14-day cycles	4 months
Dose-dense AC then paclitaxel	Four 14-day cycles Twelve 7-day cycles	
TC	Four 21-day cycles	5 months 3 months

Abbreviations

AC = doxorubicin + cyclophosphamide

TC = docetaxel + cyclophosphamide

Other chemotherapy regimens | HER2-negative tumors

Other Regimen	Schedule	Total time
Dose-dense AC	Four 21-day cycles	3 months
FAC or	Six 21-day cycles	4 months and 2 weeks
CAF	Six 28-day cycles	6 months
CEF or	Six 28-day cycles	6 months
FEC	Six 28-day cycles	6 months
CMF	Six 28-day cycles	6 months
AC then docetaxel	Four 21-day cycles Four 21-day cycles	6 months
AC then paclitaxel	Four 21-day cycles Twelve 7-day cycles	6 months
EC	Eight 21-day cycles	6 months
FAC then paclitaxel	Six 21-day cycles Twelve 7-day cycles	7 months and 2 weeks
FEC or CEF then paclitaxel	Four 21-day cycles Eight 7-day cycles	5 months
FEC or CEF then docetaxel	Three 21-day cycles Three 21-day cycles	4 months and 2 weeks
TAC	Six 21-day cycles	4 months and 2 weeks

Abbreviations

AC = doxorubicin + cyclophosphamide
 CAF = cyclophosphamide + doxorubicin + fluorouracil
 CEF = cyclophosphamide + epirubicin + fluorouracil
 CMF = cyclophosphamide + methotrexate + fluorouracil

EC = epirubicin + cyclophosphamide
 FAC = fluorouracil + doxorubicin + cyclophosphamide
 FEC = fluorouracil + epirubicin + cyclophosphamide
 TAC = docetaxel + doxorubicin + cyclophosphamide
 TC = docetaxel + cyclophosphamide

Preferred chemotherapy regimens | HER2-positive tumors

Preferred Regimen	Schedule	Total time
AC	Four 21-day cycles	1 year and 3 months
then paclitaxel	Twelve 7-day cycles	
with trastuzumab	Weekly during paclitaxel then every 7 or 21 days to complete 1 year	
AC	Four 21-day cycles	1 year and 3 months
then paclitaxel	Four 21-day cycles	
with pertuzumab	Weekly during paclitaxel	
and trastuzumab	Weekly during paclitaxel then every 21 days to complete 1 year	
Dose-dense AC	Four 14-day cycles	1 year and 2 months
then paclitaxel	Four 14-day cycles	
with trastuzumab	Weekly during paclitaxel then every 7 to 21 days to complete 1 year	
TCH	Six 21-day cycles with weekly trastuzumab, then trastuzumab every 21 days to complete 1 year	1 year
TCH + pertuzumab	Six 21-day cycles with weekly trastuzumab and pertuzumab then trastuzumab every 21 days to complete 1 year	1 year

Abbreviations

AC = doxorubicin + cyclophosphamide

FEC = fluorouracil + epirubicin + cyclophosphamide

TCH = docetaxel + carboplatin + trastuzumab

Other chemotherapy regimens | HER2-positive tumors

Other Regimen	Schedule	Total time
AC	Four 21-day cycles	1 year and 3 months
then docetaxel	Four 21-day cycles	
with trastuzumab	Weekly during docetaxel cycles then every 21 days to complete 1 year	
AC	Four 21-day cycles	1 year and 3 months
then docetaxel	Four 21-day cycles	
with pertuzumab	On day 1 during docetaxel cycles	
and trastuzumab	On day 1 during docetaxel cycles then every 21 days to complete 1 year	
FEC	Three 21-day cycles	1 year and 9 weeks
then docetaxel	Three 21-day cycles	
with pertuzumab	On day 1 during docetaxel cycles	
and trastuzumab	On day 1 during docetaxel cycles then every 21 days to complete 1 year	
FEC	Three 21-day cycles	1 year and 9 weeks
then paclitaxel	Three 21-day cycles	
with pertuzumab	On day 1 during paclitaxel cycles	
and trastuzumab	On day 1 during paclitaxel cycles then every 21 days to complete 1 year	
Paclitaxel	Twelve 7-day cycles	1 year
with trastuzumab	Weekly during paclitaxel then every 7 or 21 days to complete 1 year	
Neoadjuvant docetaxel	Four 21-day cycles	3 months
with trastuzumab and pertuzumab	On day 1 during docetaxel cycles	
Adjuvant FEC	Three 21-day cycles	1 year and 9 weeks
then trastuzumab	Every 21 days to complete 1 year	
Neoadjuvant paclitaxel	Four 21-day cycles	3 months
with trastuzumab and pertuzumab	On day 1 during docetaxel cycles	
Adjuvant FEC	Three 21-day cycles	1 year and 9 weeks
then trastuzumab	Every 21 days to complete 1 year	

Receiving chemotherapy

What to know

Before chemotherapy, your doctor may ask you to stop taking some of your medicines, vitamins, or both. Some of these treatments can cause chemotherapy to not work as well or may cause health problems while on chemotherapy. You may also have to change what you drink and eat. If you smoke, it's important that you stop.

All chemotherapy drugs for stages I and II breast cancer are liquids that are injected into a vein. Only cyclophosphamide is made in pill form too. The injection may be one fast shot of drugs into a vein or may be a slow drip called an infusion. Chemotherapy can also be given through a needle surgically placed in the chest or the arm. Trastuzumab and pertuzumab are given by infusion.

You will need to go to a chemotherapy center to receive the drugs. How long your visit will be depends on what drugs you will get. It can take a few minutes or a few hours to finish a dose of chemotherapy. It takes about 90 minutes to get the first dose of trastuzumab and about 30 minutes for later doses. For pertuzumab, it takes about 60 minutes to get the first dose and about 30 to 60 minutes for later doses.

During chemotherapy cycles, you may be given other drugs to help you feel your best. You may be given drugs to fight nausea and vomiting. You may also receive filgrastim to increase the number of white blood cells to normal levels. Blood, heart, and other tests may be given to check your health.



Chemotherapy after age 70?

The use of chemotherapy for women older than age of 70 has been questioned. You may not be given chemotherapy if you are older than 70 years for the following reasons. First, there is little research on older women to help inform treatment decisions. Second, chemotherapy may not be that helpful because the return of breast cancer can take a long time in older women. Thus, the odds that chemotherapy will stop a life-threatening recurrence are small. Third, some women have reactions to chemotherapy that threaten their health. Last, you may have health problems other than cancer that are more serious.

Side effects of chemotherapy and HER2 inhibitors

Unhealthy and unpleasant outcomes

The reactions to chemotherapy and HER2 inhibitors differ among women. Some women have many side effects. Other women have few. Some side effects can be very serious while others can be unpleasant but not serious.

Chemotherapy

Side effects of chemotherapy depend on the drug type, amount taken, length of treatment, and the person. In general, side effects are caused by the death of fast-growing cells. These cells are found in the hair follicle, gut, mouth, and blood. Thus, common side effects of chemotherapy include low blood cell counts, not feeling hungry, nausea, vomiting, diarrhea, hair loss, and mouth sores. Other side effects may include anxiety, fatigue, and peripheral neuropathy. Peripheral neuropathy is numbness or tingling of nerves in the hands and feet.

Pre-menopausal women may start menopause early because of the chemotherapy drugs. Even if menstrual periods return after chemotherapy, you may still be unable to have babies. However, don't depend on chemotherapy for birth control. You may become pregnant while on chemotherapy, which can

cause birth defects. If you had menstrual periods before chemotherapy, use birth control but not birth control made of hormones, such as "the pill." Talk to your doctors for more information.

HER2 inhibitors

Allergic reactions are common with the first or second dose of trastuzumab. You may need to take medicine for allergies. You may also have a mild flu-like response to the first dose of trastuzumab that includes fever, chills, headache, muscle aches, and nausea. This response is less common with the second and third doses. Other side effects may include damage to the heart and rarely to the lungs.

Common side effects of pertuzumab are diarrhea, nausea, and feeling tired and weak. Less common side effects include skin rash, low white blood cell counts, mouth sores, and hair loss. It is not yet clear if pertuzumab damages the heart, although similar drugs do.

Not all the side effects of chemotherapy and HER2 inhibitors are listed here. Please ask your treatment team for a complete list. If a side effect bothers you, tell your treatment team. There may be ways to help you feel better.

Review

- Adjuvant chemotherapy is chemotherapy given after surgery.
 - Doctors use many factors to decide if you should have adjuvant chemotherapy.
 - HER2-positive cancers should receive a HER2 inhibitor if undergoing adjuvant chemotherapy.
 - Chemotherapy is often given by infusion.
 - Chemotherapy and HER2 inhibitors can cause side effects. Ask your treatment team for a complete list.
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Radiation therapy



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Radiation therapy is a local treatment that uses high-energy rays to treat cancer. The rays damage the genes in cells. The damage either kills the cancer cells or stops new cancer cells from being made. Part 5 discusses how radiation therapy is given and to whom.

External radiation therapy

The most common method

Radiation therapy is given after chemotherapy is finished. It is okay to take trastuzumab during radiation therapy. If you didn't have chemotherapy, radiation therapy follows surgery. If you are pregnant, you may have radiation after your baby is born.

The most common type of radiation therapy used for breast cancer is EBRT (**e**xternal **beam **r**adiation **t**herapy). This type of therapy uses a machine outside the body to deliver radiation. Radiation beams are aimed at the tumor with help from ink marks or tiny tattoos on the skin.**

Before EBRT, pictures (images) of the breast region should be taken with a CT scan. See page 13 for information on CT scans. Imaging the region and designing the radiation treatment before EBRT is called simulation. Your doctors will use the images to decide the radiation dose and to shape the radiation

beams. Beams are shaped with computer software and hardware added to the radiation machine. The beams are shaped so that normal tissue will be spared.

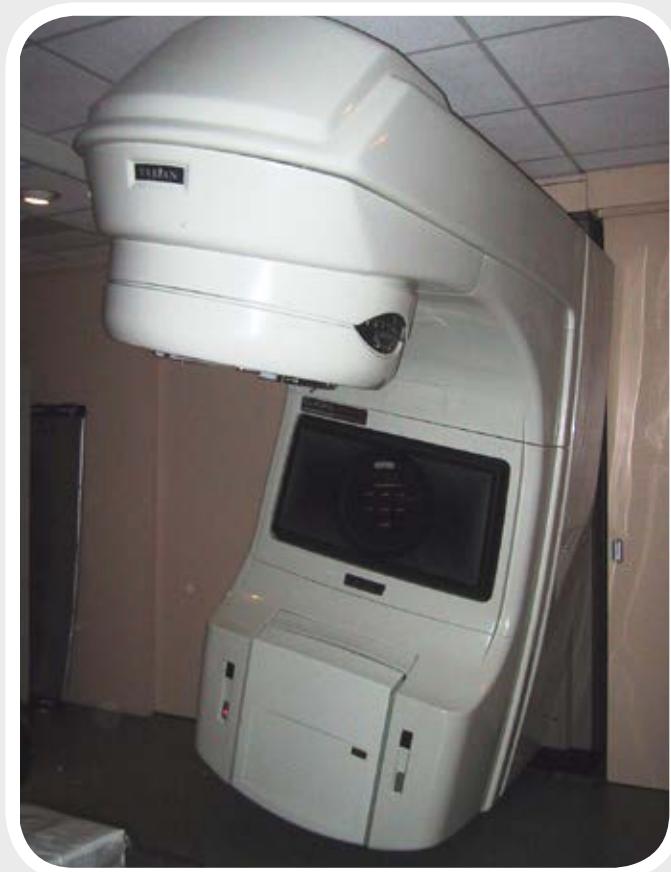
There are other methods that can be used to spare normal tissue. Moreover, there are ways to protect your heart if radiation will be given in that area. Ask your doctor what methods will be used for your treatment. Some methods are:

- Directing the beam not toward the heart,
- Lying face down during treatment,
- Holding your breath at times during treatment,
- Use of devices that keep you from moving during treatment,
- EBRT machines that give treatment only when the tumor is in the right spot, and
- ERBT machines that deliver very precise radiation beams. 3D machines deliver beams matched to the shape of the tumor. IMRT (intensity-modulated radiation therapy) uses small radiation beams of different strengths based on the thickness of the tissue.

You will be alone while a technician operates the EBRT machine from a nearby room. An EBRT machine is shown in **Figure 7**. The technician will be able to see, hear, and speak with you at all times. As treatment is given, you may hear noises. A session can take between 15 to 30 minutes. Radiation therapy is often given 5 days a week for 5 to 7 weeks but may be done quicker for some women.

Figure 7. EBRT machine

Whole-breast radiation is delivered using an EBRT machine.



Clinac 2100 C by Zubro available at commons.
[wikimedia.org/wiki/File:Clinac_2100_C.JPG](https://commons.wikimedia.org/wiki/File:Clinac_2100_C.JPG) released under GFDL and CC-BY-SA.



Should I have radiation therapy?

Deciding factors

Using the surgery results, your doctors will rate the extent of the cancer again. This is called the pathologic stage. The sentinel and axillary lymph node

dissections allow your doctors to know how many axillary lymph nodes have cancer. The number of nodes with cancer is used to recommend which areas of the body need radiation therapy.

Radiation therapy after lumpectomy

Surgery results	Where do I need radiation?
No cancer in lymph nodes	Radiation to the whole breast with or without added boost to tumor site. Partial breast radiation may be used for some women.
Cancer in 1 to 3 axillary lymph nodes	Radiation to the whole breast with or without added boost to tumor site. Strongly consider treating areas around the collarbone and internal mammary lymph nodes.
Cancer in 4 or more axillary lymph nodes	Radiation to the whole breast and areas around the collarbone with or without added boost to tumor site. Strongly consider treating internal mammary lymph nodes.

After a lumpectomy, most women receive radiation therapy. However, some women may be able to go without it. You may be able to have a lumpectomy without radiation therapy if all the following qualities describe you:

- You are 70 years old or older,
- The breast tumor was smaller than 2 cm,
- The cancer cells are hormone receptor-positive,
- No cancer was found in your lymph nodes, and
- You will be taking hormone therapy.

If you need radiation therapy, the whole breast will be treated. This is called whole breast radiation. Other areas of the chest may also be treated if cancer cells were found in your axillary lymph nodes. Radiation

therapy should be given to the internal mammary lymph nodes if tests suggest cancer is present. However, even when test results show no cancer, your doctors may still want to treat this area. Other possible radiation sites are above and below the collarbone. See [Figure 8](#) for possible treatment areas other than the breast.

Radiation boost

Toward the end of radiation, you may receive extra radiation called a boost. A boost is recommended if you are 50 years old or younger, cancer was found in your axillary lymph nodes, or there are cancer cells close to the edge of the surgical margin. The boost may be given with EBRT or by internal radiation. Internal radiation is also called brachytherapy. It involves placing radioactive seeds in the area where

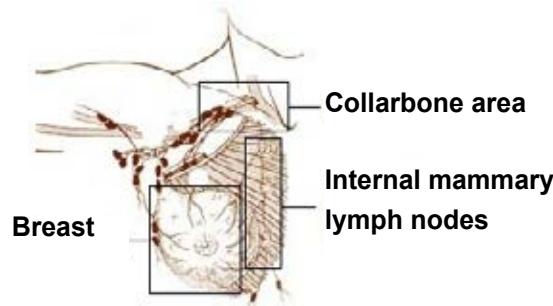
the tumor was. The seeds are placed using multiple small tubes (catheters) or one small catheter with a balloon at its end.

For multiple-catheter boost radiation, the seeds may remain in your body for minutes or days. If the seeds release a small dose of radiation, the catheters and seeds are left in your body for a few days. During this time, you must stay in the hospital. If the seeds release high doses of radiation, the seeds will remain in your body for 10 minutes. After the seeds are removed, you can leave the hospital. However, radiation is given twice a day for 5 days.

Partial breast irradiation

Instead of whole breast radiation, some women with no cancer in their lymph nodes receive partial breast irradiation. Partial breast irradiation is radiation given only to the lumpectomy site. If you're interested in this treatment, it is recommended that you receive it only within a clinical trial. A clinical trial is a type of research that studies a test or treatment. Because of clinical trials, the tests and treatments in this booklet are now widely used to help patients.

Figure 8. Radiation areas after lumpectomy



Radiation therapy after mastectomy

Surgery results	Where do I need radiation?
<ul style="list-style-type: none"> No cancer in axillary lymph nodes Breast tumor is 5 cm or smaller, and No cancer cells near edge of surgical margin 	No radiation therapy is needed.
<ul style="list-style-type: none"> No cancer in axillary lymph nodes Breast tumor is 5 cm or smaller, and Cancer cells near edge of surgical margin 	Consider treating the chest wall.
<ul style="list-style-type: none"> No cancer in axillary lymph nodes, and Breast tumor is larger than 5 cm or cancer cells at edge of surgical margin 	Consider treating the chest wall and nodes around the collarbone. Strongly consider treating the internal mammary lymph nodes.
<ul style="list-style-type: none"> Cancer in 1 to 3 axillary lymph nodes 	Strongly consider treating the chest wall, the collarbone area, and the internal mammary lymph nodes.
<ul style="list-style-type: none"> Cancer in 4 or more axillary lymph nodes 	Radiation to chest wall and around the collarbone. Strongly consider treating the internal mammary lymph nodes.

If no cancer is found in your axillary lymph nodes, radiation therapy after mastectomy is recommended based on the chance of the cancer returning. Breast cancer is less likely to return if the tumor is small and cancer cells are far from the edge of the surgical margin. Thus, you may receive radiation therapy if the tumor is larger than 5 cm or cancer cells were found in the surgical margin.

When cancer is found in 1 to 3 axillary lymph nodes, radiation therapy to your chest wall and lymph nodes

by the collarbone should be strongly considered. Radiation therapy should be given to the internal mammary lymph nodes if tests suggest cancer is present. However, even when test results show no cancer, your doctors may still want to treat this area. If cancer is in 4 or more axillary lymph nodes, the stage of the breast cancer is upstaged to stage III. In this case, radiation therapy to the chest wall and nearby lymph nodes is recommended to decrease the chances of the cancer returning.

Side effects of radiation

Unhealthy or unpleasant outcomes

You may have side effects from radiation, although not everyone does. The most common side effect of radiation therapy is changes in your skin. Your treated skin will look and feel as if it has been sunburned. It will likely become red and also may become dry, sore, and be painful when touched. Another common problem is extreme tiredness despite sleep. Women sometimes have pain in their armpit or chest after radiation and, rarely, heart and lung problems.

Not all the side effects of radiation have been listed here. Please ask your treatment team for a complete list of side effects. If a side effect bothers you, tell your treatment team. There may be ways to help you feel better.



Review

- External radiation is most often used for breast cancer.
- Doctors use many factors to decide who should have radiation therapy.
- The most common side effect of radiation therapy is changes in your skin.

Hormone therapy



6 Hormone therapy

- 58 Types of hormone therapy
- 60 Should I take hormone therapy?
- 62 Hormone therapy regimens
- 64 Side effects of hormone therapy
- 64 Review



If the breast cancer is hormone receptor-positive, hormone therapy will likely be part of your treatment. Hormone therapy stops the growth of cancer cells that is caused by hormones. Hormone therapy may be started during or after radiation therapy. Part 6 presents the recommendations for who should take hormone therapy and which types of hormone therapy should be taken.

Types of hormone therapy

4 main groups

Estrogen and progesterone are hormones that cause some breast cancer cells to make more cancer cells. Estrogen is mostly made by the ovaries and made in small amounts by the adrenal glands, liver, and body fat. Progesterone is also mostly made by the ovaries. Blocking these hormones from working or lowering hormone levels can help stop breast cancer from growing. There are many types of hormone therapy used to treat early breast cancer.

Antiestrogens

Antiestrogens are drugs that stop the effect of estrogen on cancer cell growth. Tamoxifen is an antiestrogen used for stages I and II breast cancer. Tamoxifen treats breast cancer by attaching to the estrogen receptors and blocking estrogen from attaching. It is a pill that is taken every day during the course of treatment.

Hormone therapy drugs for stages I and II breast cancer

Generic name	Brand name (sold as)	Type of hormone therapy
Anastrozole	Arimidex®	Aromatase inhibitor
Exemestane	Aromasin®	Aromatase inhibitor
Goserelin acetate	Zoladex®	Ovarian suppressor
Letrozole	Femara®	Aromatase inhibitor
Leuprolide acetate	Eligard®, Lupron®	Ovarian suppressor
Tamoxifen citrate	–	Antiestrogen

Aromatase inhibitors

Aromatase inhibitors are drugs that lower estrogen levels in the body. These drugs work by blocking a protein that makes estrogen in postmenopausal women. They can't stop the ovaries in premenopausal women from making estrogen. For this reason, these drugs are only used among postmenopausal women. Three drugs in this category are: anastrozole, letrozole, and exemestane. Each is a pill that is taken every day during the course of treatment.

Ovarian ablation

The ovaries are the main source of estrogen and progesterone in premenopausal women. Removing them stops most estrogen from being made. Surgery that removes both ovaries is called a bilateral oophorectomy. Radiation therapy to the ovaries also stops the ovaries from making estrogen and progesterone, but isn't used often. Both treatments are forms of ovarian ablation.

Ovarian suppression

Ovarian suppression is when drugs are used to tell the ovaries to make less estrogen. Ovarian suppression is achieved with drugs called LHRH (luteinizing hormone-releasing hormone) agonists. LHRH is a hormone made in the brain that helps to regulate estrogen production in the ovaries. LHRH agonists stop LHRH from being made, which stops the ovaries from making more estrogen. Goserelin and leuprolide are LHRH agonists and should be given as monthly injections under the skin.

Should I take hormone therapy?

Deciding factors

You may receive hormone therapy if the breast cancer cells are hormone receptor-positive. If you are pregnant, you may receive hormone therapy after your baby is born. Hormone therapy lowers the chances (risk) of the cancer returning after local treatment, chemotherapy, or both. How likely is it that the cancer will return differs among women. Doctors predict the return of cancer based on features of

the cancer. The recommendations of the NCCN doctors are presented next. Their recommendations are based on the type of breast cancer, size of the tumors, and other factors.

Lower-risk breast cancers

Tubular and mucinous breast cancers have a low risk of returning after local treatment. See page 35 for more information about these breast cancers. The recommendations for hormone therapy for lower-risk breast cancer are listed below.

Lower-risk breast cancer | Hormone receptor-positive

Size of breast tumor	Size of lymph node tumor	Do I need hormone therapy?
Smaller than 1.0 cm	None or tiny (≤ 2.0 mm) tumors	No
1.0 to 2.9 cm	None or tiny (≤ 2.0 mm) tumors	Consider hormone therapy
3.0 cm or larger	None or tiny (≤ 2.0 mm) tumors	Yes
Any size	Larger than 2.0 mm	Yes

Hormone therapy for breast cancer isn't recommended when the breast tumor is smaller than 1.0 cm and there is no or little cancer spread to the axillary lymph nodes. Hormone therapy isn't needed because the results of local treatment are often very good. However, you may want to take hormone therapy to lower your risk for cancer in the other breast and

lower your small risk for recurrence in the treated breast. The results of local treatment for breast tumors between 1.0 and 2.9 cm in width are still very good, but hormone therapy may be considered. Hormone therapy should be taken when the breast tumor is 3.0 cm or larger or at least one tumor in your axillary lymph node is 2.0 mm or larger.

Higher-risk breast cancers

Most types of breast cancer are more likely to spread beyond the breast than tubular and mucinous cancers. Examples include invasive ductal and lobular carcinomas. However, many of the “higher-risk” breast cancers that are found and treated early may be cured. Higher-risk breast cancers are described on page 36.

The recommendations for hormone therapy for higher-risk breast cancer are listed below.

Higher-risk breast cancer | Hormone receptor-negative

Size of breast tumor	Size of lymph node tumor	Do I need hormone therapy?
0.5 cm or smaller	No tumors	Consider hormone therapy
	Tiny (≤ 2.0 mm) tumors	Yes
0.51 cm or larger	None or tiny (≤ 2.0 mm) tumors	Yes
Any size	Larger than 2.0 mm	Yes

The results of local treatment for a breast tumor 0.5 cm or smaller with no cancer spread to the axillary lymph nodes are usually very good. However,

hormone therapy may be considered to lower the risk of recurrence. For all other breast tumors, hormone therapy should be taken.

Hormone therapy regimens

Recommended drugs

Which hormone therapy you should take is based on your menopausal status. Menopause is the point in time when you won't have another menstrual period again. If you haven't had a menstrual period in the past year, you are considered postmenopausal.

Breast cancer doctors also define menopause as when the ovaries aren't able to make high levels of estrogen.

If you were having menstrual periods (premenopausal) before starting chemotherapy, the absence of menstrual periods after chemotherapy doesn't mean you're postmenopausal. Your ovaries may still be working despite no menstrual periods or may start working again. To confirm your menopausal status, the amount of estrogen or FSH (follicle-stimulating hormone) in your blood needs to be tested. If you are taking LHRH agonists, it isn't possible to know your menopausal status.

Hormone therapy drugs are usually taken for 5 to 10 years. The first hormone therapy taken is the initial treatment. Sometimes a second type of hormone therapy is taken within the 5-year period. This is called sequential treatment. Hormone therapy taken beyond the 5-year period is called extended treatment.

Premenopausal women

If you still have menstrual periods, tamoxifen is recommended. Initial treatment with tamoxifen is for 5 years. Ovarian ablation or suppression may be added to tamoxifen. After 5 years of tamoxifen, your menstrual status will be assessed again. If you are still premenopausal, you may stop hormone therapy or consider taking tamoxifen for another 5 years. If you're postmenopausal, taking an aromatase inhibitor for up to 5 years is recommended or consider taking tamoxifen for another 5 years. The hormone therapy recommendations for premenopausal women are listed in the chart below.

Hormone therapy recommendations | Premenopausal women

Initial treatment	Extended treatment
Tamoxifen for 5 years ± ovarian suppression or ablation	<p>If still premenopausal:</p> <ul style="list-style-type: none"> Consider taking tamoxifen for another 5 years, or Stop taking hormone therapy <p>If postmenopausal:</p> <ul style="list-style-type: none"> Take aromatase inhibitors for 5 years, or Consider taking tamoxifen for another 5 years

Postmenopausal women

In the chart, eight options for hormone therapy are listed if you are postmenopausal. An aromatase inhibitor may be taken either as initial treatment or follow tamoxifen as a sequential or extended treatment. In some cases, taking tamoxifen alone is an option.

The hormone therapy recommendations for postmenopausal women are listed in the chart below.

Hormone therapy recommendations | Postmenopausal women

Initial, sequential, and extended treatment
Aromatase inhibitor for 5 years
Tamoxifen for 2–3 years followed by an aromatase inhibitor to complete 5 years of hormone therapy
Tamoxifen for 2–3 years followed by an aromatase inhibitor taken for up to 5 years
Aromatase inhibitor for 2–3 years followed by tamoxifen to complete 5 years of hormone therapy
Tamoxifen for 4.5–6 years followed by an aromatase inhibitor for up to 5 years
Consider tamoxifen for 9.5–11 years
Tamoxifen for 5 years if aromatase inhibitors aren't an option
Consider tamoxifen for 10 years if aromatase inhibitors aren't an option

Side effects of hormone therapy

Unhealthy and unpleasant outcomes

For many women, hormone therapy causes symptoms of menopause. Menopausal symptoms include hot flashes, vaginal discharge or dryness, sleep problems, weight gain, hair thinning, fatigue, and changes in mood. Which symptoms you will have may differ from other women.

Tamoxifen also has two rare but more serious side effects: 1) cancer of the uterus; and 2) blood clots. For most women with breast cancer, the benefits of taking tamoxifen far outweigh the risks. Aromatase

inhibitors don't cause cancer and very rarely cause blood clots. However, they can weaken your bones (called osteoporosis) and cause bone fractures. Checking your bone health with regular bone mineral density tests can show bone weakness before fractures occur. Your doctor can order medicine to strengthen your bones if necessary.

Not all the side effects of hormone therapy are listed here. Please ask your treatment team for a list of all common and rare side effects. If a side effect bothers you, tell your treatment team. There may be ways to help you feel better.

Review

- Hormone therapy stops the growth of cancer cells that is caused by hormones.
 - Hormone therapy is taken by women with hormone-positive breast cancer.
 - There are 4 main groups of hormone therapy.
 - Which types of hormone therapy should be taken are based on menopausal status.
 - Hormone therapy causes symptoms of menopause.
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Follow-up care



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Follow-up care is important. It is done to assess your general health, find new breast tumors early, and check for side effects of treatment. You may still be taking trastuzumab or hormone therapy when follow-up care starts.

Follow-up tests

Assessing treatment outcomes

Medical history and physical exam

A medical history and physical exam are recommended every 4 to 6 months for 5 years. If test results are normal for 5 years, you should then have these tests every year. During your visit with your doctor, tell him or her about any new or worse symptoms you have. There may be ways to get relief. For more information about these tests, see page 10.

Mammography

Mammography is recommended every year. The use of breast MRI is an option if you have a high risk for cancer in the other breast. More information about these imaging tests can be found on page 12. If the breast cancer returns, read Part 8.

Hormone therapy check-up

Health care recommendations

Stay on hormone therapy

If you take hormone therapy, it is very important that you don't stop taking your medication. If you do, the cancer will be more likely to return. Tell your doctor about any side effects that make you think about quitting. There may be ways to get relief.

GYN (gynecologic) exam

If you take tamoxifen, a GYN exam is needed each year since this drug can increase your chances for cancer of the uterus. For this exam, your doctor will ask about any abnormal bleeding. If you have seen any vaginal bleeding that isn't normal for you, tell your doctor.

Bone mineral density

If you take an aromatase inhibitor, you should have your bone mineral density tested regularly. Your bone mineral density should also be tested if cancer treatments caused you to start menopause. Aromatase inhibitors and starting menopause early can cause bone loss. Bone mineral density tests show your doctors how strong your bones are. These tests use x-rays or sound waves.

Healthy lifestyle

Get better treatment results

Physical activity

Starting or maintaining an active lifestyle is recommended. Physical activity has been linked to better treatment results. Ask your treatment team about ways for you to be more active.

Healthy body weight

Like physical activity, a healthy body weight has been linked to better treatment results. BMI (**body mass index**) is a measure of body fat based on height and weight. A BMI score of 20 to 25 is recommended in order to have the best overall health and breast cancer outcomes. Ask your treatment team about ways to achieve a healthy body weight.



Review

- Medical history, physical exam, and mammography are tests you should receive during follow-up care.
 - If you are taking hormone therapy, it is important that you don't stop until your doctor says you can.
 - Getting GYN exams and bone mineral density tests are important if on hormone therapy.
 - Be active and keep a healthy body weight.
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Treatment for recurrence



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For some women, breast cancer returns after a disease-free period. Breast cancer may return in or near the breast, near to where the breast was removed, or in distant organs. If the breast cancer returns in distant sites, read the NCCN Guidelines for Patients®: Stage IV Breast Cancer. Part 8 discusses treatment for cancer that returns in a breast or near to where a breast is or was.

Treatment planning

Recommended tests

Test names and counseling

Medical history and physical exam

CBC and liver function tests

CT scan of the chest

CT or MRI scan of the abdomen ± pelvis

Brain MRI if symptoms

Bone scan or sodium fluoride PET/CT (positron emission tomography-computed tomography)

FDG PET/CT if needed

X-rays of bones if needed

Biopsy of recurrence

Hormone and HER2 receptor tests if status was unknown or negative before

Genetic counseling if needed

Many of the tests that were described in Part 2 are given if the cancer returns. Such tests include a physical exam, blood tests, CT scans, and hormone and HER2 receptor tests. Possible other tests include:

Brain MRI

MRI is very useful for viewing the brain. You may have an MRI if you have symptoms that suggest the cancer has spread to the brain. Symptoms of cancer in the brain include chronic headaches, seizures, loss of balance, difficulty walking, speech problems, changes in vision, weakness on one side of the body, and personality changes.

PET/CT

Instead of a bone scan, another way to image bones is by the use of both PET and CT scans (PET/CT). Some cancer centers have an imaging machine that does both scans. At other centers, the scans are done with two machines.

Like a bone scan, PET also uses a radiotracer to see the activity of cells. The radiotracer used to image bone with PET is sodium fluoride. Sodium fluoride

PET/CT is a costly test but shows areas of bone damage and repair better than a bone scan. It also has a shorter waiting time of 40 to 60 minutes for the radiotracer to be seen and a shorter scanning time of 15 to 20 minutes than a bone scan.

Another type of PET used to see if breast cancer has spread is FDG (fluorodeoxyglucose) PET/CT. FDG is a radiotracer that is made of fluoride and a simple form of sugar called glucose. Cancer cells use more FDG than normal cells and thus show up as bright spots on pictures. For this test, you must fast for 4 hours or more. FDG PET/CT is most helpful when other imaging tests are unclear and may be helpful with finding breast cancer that has spread to lymph nodes or distant sites.

X-rays

X-rays of bones that hurt are recommended. Long and weight-bearing bones that aren't normal on bone scan or PET/CT should also be x-rayed. During an x-ray, you must lie still on a table while the x-ray machine sends small amounts of radiation into your body. Images made from the x-rays are seen on a screen.



Treatment for local recurrence

Local recurrence

Prior treatment	Treatment for recurrence
Breast-conserving therapy	Total mastectomy + axillary dissection. Consider adjuvant treatment.
Mastectomy alone	Surgery if possible and radiation therapy to the chest wall and around the collarbone. Consider adjuvant treatment.
Mastectomy + radiation therapy	Surgery if possible. Consider adjuvant treatment.

Treatment for a local recurrence depends on your prior treatment. If you had breast-conserving therapy, a total mastectomy is recommended. You may also have an axillary lymph node dissection if not done before. If previously treated with mastectomy alone, you may have surgery to remove the cancer followed by radiation therapy to the chest wall and

lymph nodes around the collarbone. If you had a mastectomy and radiation therapy, the cancer should be removed by surgery if possible. For all recurrences, adjuvant treatment with chemotherapy, chemotherapy with trastuzumab, or hormone therapy may be given.

Treatment for lymph node recurrence

Lymph node recurrence

Lymph node site	Treatment for recurrence
Armpit (axillary)	If possible, surgery and radiation therapy to the chest wall, axilla, and nodes around the collarbone. Consider adjuvant treatment.
Above the collarbone (supraclavicular)	If possible, radiation therapy to the chest wall and nodes around the collarbone. Consider adjuvant treatment.
Just inside the ribs near the breast bone (internal mammary)	If possible, radiation therapy to the chest wall and nodes around the collarbone and along the breastbone. Consider adjuvant treatment.

The cancer may return to your lymph nodes with or without a local recurrence. If cancer is found in your axillary lymph nodes, surgery and radiation therapy is recommended. Radiation therapy should target your chest wall, the side of your body under the armpit (axilla), and the lymph nodes around your collarbone. Supraclavicular lymph nodes are located above the collarbone and internal mammary nodes are located along the breastbone. When cancer is found in either your supraclavicular or internal mammary

lymph nodes, radiation therapy without surgery is suggested. For a supraclavicular recurrence, radiation should target your chest wall and your lymph nodes around the collarbone. For an internal mammary recurrence, radiation should target your chest wall, internal mammary nodes, and nodes around the collarbone. For all recurrences, adjuvant treatment with chemotherapy, chemotherapy with trastuzumab, or hormone therapy may be given.

Review

- Breast cancer may return in or near the breast, near to where the breast was removed, or in distant organs.
 - You may undergo further tests to plan treatment for the cancer.
 - Treatment for a local recurrence is based on prior treatment.
 - Treatment for a recurrence in your lymph nodes depends on which lymph nodes have cancer.
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Making treatment decisions



9 Making treatment decisions

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78 Questions to ask your doctor

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Having breast cancer can be very stressful. While absorbing the fact that you have cancer, you have to learn about tests and treatments and accept a treatment plan. Parts 2 through 8 gave the treatment recommendations of the NCCN breast cancer experts. Part 9 has other useful information on treatment planning.

Have a treatment plan

A roadmap through cancer care

Learning that you have breast cancer starts an unplanned journey to an unknown place. A treatment plan is like having a roadmap for your journey. It is a written course of action through treatment and beyond. A treatment plan for stage I or II breast cancer often has the following parts:

- Your treatment team – Cancer care is a team effort. It's helpful to have the names and contact information of all your health care providers listed.
- Test results – Since breast cancers can greatly differ, test results that describe the cancer are included.

- Cancer treatment – There is no single treatment practice for all women. The treatment that you agree to have should be reported along with all known side effects.
 - Symptom control – Cancer and its treatment can cause mental and physical symptoms. Treatment of symptoms should be addressed.
 - Survivorship care – The end of cancer treatment is not the end of your health care. Having a healthy lifestyle, follow-up tests, and care of your general health are ongoing concerns.

Get a 2nd opinion

Finding the best treatment plan

Your doctor may agree with the recommendations in this booklet or may recommend another treatment plan. While breast cancer can't be ignored, there is time to choose which treatment plan is best for you. You can have another doctor review your test results and recommend treatment. This is called getting a 2nd opinion. Getting a 2nd opinion may help you feel more at peace about your treatment plan.

Your test results will need to be sent to the doctor giving the 2nd opinion. You may feel uneasy asking for your test results to be sent. However, a 2nd opinion is a normal part of cancer care. When doctors have cancer, most will talk with more than one doctor before choosing their treatment. What's more, some health plans require a 2nd opinion. If your health plan doesn't pay for a 2nd opinion, you have the choice of paying for it yourself.

Questions about testing to ask your doctor

Ask your doctors questions:

1. What tests do you recommend?
 2. Where will the tests take place? Will I have to go to the hospital?
 3. How long will the tests take?
 4. Will any test hurt?
 5. What if I am pregnant?
 6. How do I prepare for testing?
 7. Should I bring a list of my medications?
 8. Should I bring someone with me?
 9. How soon will I know the results and who will explain them to me?
 10. Can I have a copy of the test results including the pathology report?
 11. Who will talk with me about the next steps? When?
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Questions about treatment to ask your doctor

Ask your doctors questions:

1. What treatments do you recommend?
 2. What are the risks and benefits of each treatment?
 3. How do my age, health, and other factors affect my choices?
 4. Would you help me get a 2nd opinion?
 5. What can I do to prepare for treatment?
 6. How soon should I start treatment?
 7. How much will the treatment cost? How can I find out how much my health insurance will cover?
 8. How likely is it that I'll be cancer-free after treatment?
 9. What symptoms of treatment should I look out for?
 10. What are my chances that the cancer will return?
 11. What are my options for breast reconstruction?
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 **Websites****American Cancer Society**

www.cancer.org/Cancer/BreastCancer/index

Breastcancer.org

www.breastcancer.org

Cancer Support Community

www.cancersupportcommunity.org

Komen Foundation

ww5.komen.org

Living Beyond Breast Cancer

www.lbbc.org

National Cancer Institute

www.cancer.gov/cancertopics/types/breast

National Coalition for Cancer Survivorship

www.canceradvocacy.org

Decision aids

For breast-conserving therapy vs. mastectomy:

Informed Medical Decisions Foundation

<http://www.informedmedicaldecisions.org/patient-page/>

National Cancer Institute

www.cancer.gov/cancertopics/treatment/breast/surgerychoices

WebMD

www.webmd.com/breast-cancer/should-i-have-breast-conserving-surgery-or-a-mastectomy-to-treat-early-stage-breast-cancer

Glossary

Dictionary
Acronyms

Dictionary

abdomen

The belly area between the chest and pelvis.

adjuvant treatment

Treatment given after the main treatment used to cure disease.

adrenal gland

A small organ on top of each kidney that makes hormones.

alkaline phosphatase (ALP)

A protein found in most tissues of the body.

allergic reaction

Symptoms caused when the body is trying to rid itself of invaders.

antiestrogen

A drug that stops estrogen from attaching to cells.

areola

A darker, circular area of skin on the breast surrounding the nipple.

aromatase inhibitor

A drug that lowers the level of estrogen in the body.

axillary lymph nodes

Lymph nodes under the armpit.

axillary lymph node dissection

Surgery to remove axillary lymph nodes.

bilateral oophorectomy

Surgical removal of both ovaries.

biopsy

Removal of small amounts of tissue or fluid to be tested for disease.

body mass index (BMI)

A measure of body fat based on height and weight.

bone mineral density

A test that measures the strength of bones.

bone scan

A test that uses radioactive material to assess for bone damage.

boost

An extra dose of radiation to a specific area of the body.

brachytherapy

Radiation received from a radioactive object placed near or in the tumor. Also called internal radiation.

breast-conserving therapy

Cancer treatment that includes removing the breast lump and radiation therapy.

breast implant

A small bag filled with salt water, gel, or both that is used to remake breasts.

breast reconstruction

Surgery to rebuild breasts.

cancer staging

The rating of the growth and spread of cancer.

carcinoma

Cancer that starts in cells that form the lining of organs and structures in the body.

catheter

A flexible tube inserted in the body to give treatment or drain fluid from the body.

chest wall

The layer of muscle, bone, and tissue on the outer part of the chest.

clinical breast exam

A physical exam of the breasts by a health professional to feel for disease.

clinical stage

The rating of the extent of cancer based on tests before treatment.

complete blood count (CBC)

A test of the number of blood cells.

computed tomography (CT)

A test that uses x-rays from many angles to make a picture of the insides of the body.

contrast

A dye put into the body to make clearer pictures during imaging tests.

core needle biopsy

Use of a needle to remove a large tissue sample.

deoxyribonucleic acid (DNA)

A very thin and long molecule that contains genetic code. Also called the “blueprint of life.”

diagnostic bilateral mammography

A test that uses x-rays to make pictures of the insides of both breasts.

duct

A tube in the breast that drains breast milk.

ductal carcinoma

Cancers that started in ductal cells.

estrogen

A hormone that develops female body traits.

external beam radiation therapy (EBRT)

Treatment with radiation received from a machine outside the body.

fertility specialist

An expert who helps women to have babies.

fine-needle aspiration (FNA)

Removal of a small tissue sample with a very thin needle.

flap

Tissue taken from one area of the body and used in another area.

follicle-stimulating hormone (FSH)

A hormone made by the ovaries.

gene

Coded instructions in cells for making new cells and controlling how cells behave.

general anesthesia

A controlled loss of wakefulness from drugs.

genetic counseling

Discussion with a health expert about the risk for a disease caused by changes in genes.

hereditary breast cancer

Breast cancer caused by abnormal coded information in cells that is passed from parent to child.

hernia

A health condition in which muscles weaken or tear allowing organs or tissue to extend out.

hives

Itchy, swollen, and red skin caused by the body ridding itself of an invader.

hormone

A chemical in the body that activates cells or organs.

hormone receptor

A protein in cell membranes that bind with hormones.

hormone receptor-negative

Cancer cells that don't use hormones to grow.

hormone receptor-positive

Cancer cells that use hormones to grow.

hormone therapy

Treatment that stops the making or action of hormones in the body.

hot flashes

A health condition of intense body heat and sweat for short periods.

human epidermal growth factor receptor 2 (HER2)

A protein on the edge of a cell that send signals for the cell to grow.

human epidermal growth factor receptor 2 (HER2)-negative

Cancer cells with normal numbers of HER2 receptors.

human epidermal growth factor receptor 2 (HER2)-positive

Cancer cells with too many HER2 receptors.

imaging test

A test that makes pictures of the insides of the body.

immunohistochemistry (IHC)

A lab test of cancer cells to find specific cell traits involved in abnormal cell growth.

infusion

A method of giving drugs slowly through a needle into a vein.

in situ hybridization (ISH)

A lab test of that counts the number of copies of a gene.

internal mammary

The area along the breastbone.

invasive breast cancer

Cancer cells have grown into the supporting tissue of the breast.

liver function test

A test that measures chemicals made or processed by the liver.

lobular carcinoma

Cancer that started in lobular cells.

lobule

A gland in the breast that makes breast milk.

local anesthesia

A controlled loss of feeling in a small area of the body from drugs.

lumpectomy

Surgery to remove a breast lump and some normal tissue around it.

luteinizing hormone-releasing hormone (LHRH)

A hormone made in the brain that helps regulate estrogen production by the ovaries.

lymph

A clear fluid containing white blood cells.

lymphedema

Swelling of the body due to a buildup of lymph.

lymph node

Small groups of special disease-fighting cells located throughout the body.

magnetic resonance imaging (MRI)

A test that uses radio waves and powerful magnets to make pictures of the insides of the body.

mammogram

A picture of the insides of the breast that is made by an x-ray test.

mastectomy

Surgery to remove the whole breast.

medical history

All health events and medications taken to date.

menopause

The point in time when menstrual periods end.

metaplastic carcinoma

Cancer that changed from one cell type to another.

mixed carcinoma

Cancer that has more than one cell type.

mucinous breast cancer

Cancer that has a lot of mucus around the cells. Also called colloid breast cancer.

multiple-catheter radiation

Use of multiple small tubes to place radioactive seeds in your body for treatment.

mutation

An abnormal change in the instructions in cells for making and controlling cells.

neoadjuvant treatment

Treatment given before the main treatment used to cure disease.

nipple replacement

The rebuilding of a breast nipple.

osteoporosis

A disease that causes thinning, weakened bones.

ovarian ablation

Methods used to stop the ovaries from making estrogen.

ovarian suppression

Methods used to lower the amount of estrogen made by the ovaries.

partial breast irradiation

Treatment with radiation that is only directed at the surgery site.

pathologic stage

A rating of the extent of cancer based on tests given after treatment.

pathologist

A doctor who's an expert in testing cells and tissue to find disease.

pelvic exam

A review of the female organs in the pelvis.

pelvis

The area between the hip bones.

physical exam

A review of the body by a health expert for signs of disease.

positron emission tomography (PET)

Use of radioactive material to see the shape and function of body parts.

postmenopause

The state of the end of menstrual periods.

premenopause

The state of having regular menstrual periods.

primary tumor

The first mass of cancer cells in the body.

progesterone

A hormone in women that is involved in sexual development, menstruation, and pregnancy.

puberty

The time when teens sexually develop.

radiation therapy

The use of radiation to treat cancer.

radiologist

A doctor who specializes in reading imaging tests.

radiotracer

A substance with radioactive material that is used to make pictures of body parts.

receptor

A protein within cells to which substances can attach.

recurrence

The return of cancer after a disease-free period.

sentinel lymph node

The first lymph node to which cancer cells spread after leaving the breast tumor.

sentinel lymph node dissection

Surgery to remove the first lymph node(s) to which cancer cells spread after leaving the breast tumor. Also called sentinel lymph node dissection.

side effect

An unhealthy or unpleasant physical or emotional response to treatment.

simulation

The steps needed to prepare for treatment with radiation.

skin-sparing mastectomy

A surgery that removes all breast tissue but saves as much breast skin as possible.

stereotactic needle biopsy

Use of mammography to guide a needle into a breast tumor to remove samples.

stroma

Supportive tissue in the breast.

suprACLAVICULAR

The area right above the collarbone.

surgical margin

The normal tissue around the edge of a tumor that is removed during surgery.

targeted therapy

Drugs that stop the action of molecules that start the growth of cancer cells.

total mastectomy

Surgery that removes the entire breast but no chest muscles. Also called simple mastectomy.

treatment plan

A written course of action through cancer treatment and beyond.

tubular breast cancer

Cancer that has cells that look like tubes.

ultrasound

Use of sound waves to make pictures of the insides of the body.

ultrasound-guided biopsy

Use of ultrasound to guide a needle into a breast tumor to remove samples.

volume displacement

The shifting of breast tissue.

vulva

The female organs between the legs.

whole breast radiation

Treatment of the entire breast with radiation from a machine outside the body.

Acronyms

BMI

body mass index

CBC

complete blood count

CT

computed tomography

DNA

deoxyribonucleic acid

EBRT

external beam radiation therapy

FNA

fine-needle aspiration

FSH

follicle-stimulating hormone

IHC

immunohistochemistry

IMRT

intensity-modulated radiation therapy

ISH

in situ hybridization

LHRH

luteinizing hormone-releasing hormone

MRI

magnetic resonance imaging

PET

positron emission tomography

RT-PCR

reverse transcriptase-polymerase chain reaction

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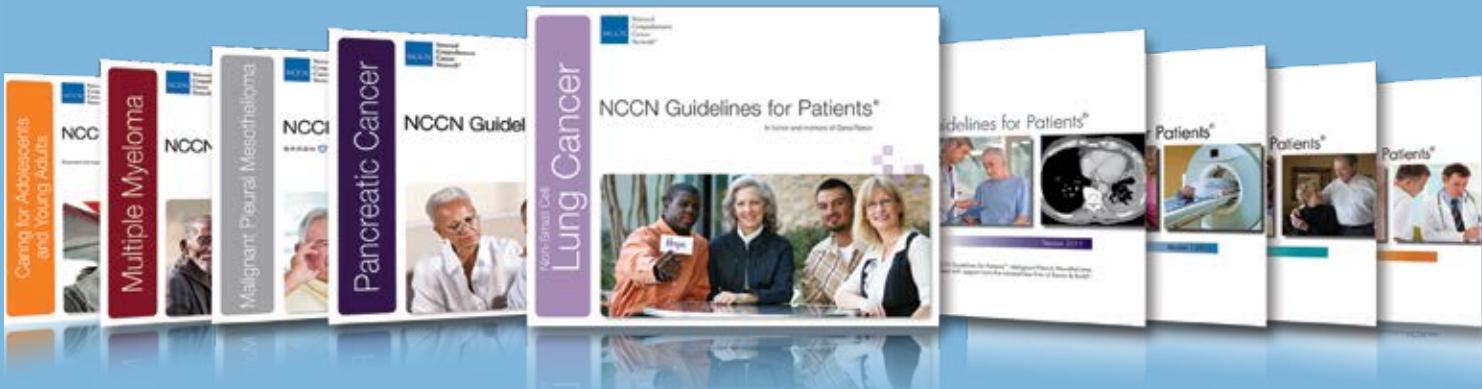
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mayoclinic.org/departments-centers/mayo-clinic-cancer-center

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